CAREER PROGRESS AS IT DEPENDS UPON PERSONAL FACTORS AND EDUCATION -- AN EXPLORATORY DATA ANALYSIS

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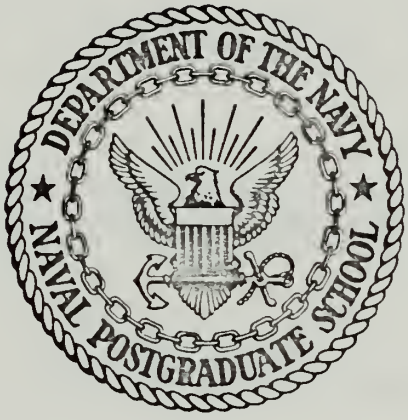

THESIS

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by

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September 1972

Career Progress As It Depends Upon Personal Factors and Education -- An Exploratory Data Analysis

by

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ABSTRACT

An analytical review of two consecutive years' data from the Enlisted Master File was made to see if the traits of race, years of education, and occupational group appeared to have any effect on advancement of Navy enlisted personnel. A matrix of the percentage of personnel having each trait, showing advancement, non-advancement, reduction in rate or discharge was computed, and comparison of advancement percentage was made against data from a similar matrix generated for total Navy personnel.

Further conditional matrices were generated for personnel in the Supply ratings only, and comparisons made between the above traits, as well as the traits of number of enlistments, age at enlistment and individual supply ratings. The latter were compared against total of all supply ratings.

The purpose was to reveal existence of differences which might be a factor in personnel advancement, not to explain causes of these differences.

TABLE OF CONTENTS

I. INTRODUCTION

Personnel systems composed of a formal rate or grade structure that utilize an advancement procedure to move persons through or out of the system are commonplace in modern large organizations. In particular the enlisted rates of each of the military services provide a classic example of this type.

Personnel turnover in the United States Navy often creates problems which have a direct effect on the readiness of the units experiencing the turnover. Morale may be seriously affected when a unit experiences a high turnover rate. Any person who, once having been successfully trained by the Navy, is lost by failure to reenlist, seriously reduces the operational readiness of the Navy. Reasons for non-reenlistment by Navy personnel are many. One factor which causes a turnover of personnel is advancement or non-advancement of the men involved.

Military enlisted advancements are controlled by federal laws and by constraints imposed by service Secretaries, who frequently act as approving authority for the respective service's internally generated promotion plan. Guidance for enlisted advancement in the Navy is contained in Ref. 1, 1418 series Notices from the Bureau of Naval Personnel, and semi-annual letters related to each examination from the Navy Examination Center.

Examinations are scheduled on an annual or semi-annual basis to aid in selection of enlisted personnel for advancement to the next higher rate. Total numbers to be advanced are established in accordance with previous and projected attrition, but must be at least 5 percent for each rating. For ratings which do not require this given percentage at a given time, the percentage is still further increased, and percentages for other ratings reduced to compensate.

Time in rate -- the number of months or years a man has spent in his current rate -- is one factor that determines whether a man is eligible to take the examination for advancement. Current time in rate requirements are listed in Table 1.

Thus there exist several policy variables, including total number in each rate, advancement opportunity to next rate, and time in rate, to mention a few, which control the functioning of the advancement system.

The purpose of this paper is to attempt to determine from a review of data from the Enlisted Master Data File the flow of personnel through a multirate system, and to see if certain basic characteristics might be determining factors in advancement and hence re-enlistment.

This paper was originally intended to deal with data from several consecutive years, specifically comparing the Markov-like transition matrices developed for successive years to see if they displayed a stationary property. If so the transition matrices provide a possible model for predicting advancement flow through the system.

CURRENT TIME IN RATE REQUIREMENTS

From	To	Time in Rate
E1	E2	4 months
E2	E3	8 months
E3	E4	6 months
E4	E5	12 months
E5	E6	24 months
E6	E7	36 months
E7	E8	36 months
E8	E9	24 months

Table 1

However, since data for only two consecutive years were obtainable our approach is different. Rather than to compare years, various conditional matrices were generated, conditioning upon basic characteristics such as race, years of education, and occupational group as explanatory variables. To aid in computations a subgroup consisting of just supply ratings were extracted and matrices computed for this subgroup. After forming these matrices, they were reviewed to determine if there were any significant differences by variable from the total.

The purpose of this paper was not to determine what causes the differences that exist but rather to identify them tentatively as possible trouble areas in personnel planning, and retention. Our approach might be a means of identifying so-called "sick" ratings -- ratings which do not have, nor are predicted to have, sufficient numbers of qualified persons to fill rate requirements -- prior to these ratings having any great affect upon the radiness of the Navy.

At this stage of the investigation of data no formal statistical methods have been used. The reasons for this are (a) time constraints; much of the effort has been devoted to amassing the data presented, leaving only a little time for the exploratory analysis shown; (b) lack of suitable statistical models and procedures: most percentages involve exceedingly large numbers or cases, and "significant" difference" will be easy to establish on the basis of binomial (independent) trials, for example, more sophisticated analysis, e.g., analyses of variance following a logit transformation, are in prospect.

II. PROCEDURE

To make the comparisons desired in this thesis, data on all enlisted Navy personnel were obtained from the active enlisted magnetic tape files maintained by the Bureau of Naval Personnel, as of the end of two consecutive fiscal years. An extraction of 55 characters per man was made by the author from the master record of 550 characters per man. Appendix II lists the format of the Master Magnetic Tape Record maintained by the Bureau of Naval Personnel and Ref. 2 gives detailed information on each data field contained thereon. Data as of 30 June 1970 (tape 1) and as of 30 June 1971 (tape 2) was used in this study.

The IBM 360-67 computer at the Naval Postgraduate School, Monterey, was used in the production of transition-like matrices showing the movement of each man from one state to another during the fiscal year considered. The transition matrix consisted of eleven possible states as follows: received, E1, E2, E3, E4, E5, E6, E7, E8, E9, discharged. The program compared the personnel listed on the tapes by service number and recorded the movement of each man from state to state as follows:

a. if the individual appeared on both tape 1 and tape 2 he was shown as either remaining in the same state, advancing one or more states - as permitted by law - or being reduced in rate one or more state.

b. if the individual appeared on tape 1 and not on tape 2 he was counted as being discharged during the year and was shown in state (column) 11 and the corresponding row as the rate he was in at the beginning of the year.

c. if the individual appeared on tape 2 and not on tape 1 he was counted as being received during the year and was shown in row one and the state (column) corresponding to his rate at the end of the year.

After creation of the basic matrices a second matrix was created showing the percentages of the beginning number in each state. This later matrix was the one from which data was extracted to be reviewed for similarities or differences.

Table 2 shows the total matrix from which data used as a basis for review with the conditional matrices later generated was extracted. Had more than two years of data been obtainable additional total matrices would have been run to check for the plausibility of a steady state situation.

The next runs consisted of a breakdown by race (5 matrices), years of education (20 matrices), and occupational groups (9 matrices). Appendix A lists the ratings in each occupational group as specified by the Bureau of Personnel.

A review of Table 2 revealed what at first glance would appear to be an impossibility, i.e., an individual who first enters the Navy reaches E4 or above at the end of the first year. Reasons why a man

TRANSITION MATRIX FOR TOTAL NAVY

STATE / STATE	Received	E1	E2	E3	E4	E5	E6	E7	E8	E9	Discharged
Received	0	13	35	42	8	1	0	0	0	0	0
E1	0	4	28	33	5	0	0	0	0	0	31
E2	0	1	20	45	7	0	0	0	0	0	26
E3	0	0	1	37	33	1	0	0	0	0	28
E4	0	0	0	1	42	22	0	0	0	0	34
E5	0	0	0	0	1	59	8	0	0	0	32
E6	0	0	0	0	0	0	84	6	0	0	9
E7	0	0	0	0	0	0	0	83	5	0	12
E8	0	0	0	0	0	0	0	0	74	8	18
E9	00	0	0	0	0	0	0	0	0	77	23
Discharged	0	0	0	0	0	0	0	0	0	0	0

Table 2

might be at one of the higher rates (E4 or above) at the end of the first year are:

a. he could be a reservist coming on active duty,

b. he could be returning to the Navy after broken service,

c. he could be in one of the ratings recruiting personnel at advanced rates to compensate for previous civilian education or experience.

d. A man's record may be missing from tape 1 and would then only be on tape 2 and thus he would be counted as received during this year.

To estimate the fequency of this latter possibility a review of individual records would have to be made. This might also point out a need for periodical review and updating of the master file.

Following creation of the matrices, the advancement percentages for each of the conditional matrices generated were extracted and a modified version of the plotting package [Ref. 3] for the computer was created and used in plotting total Navy percentages versus each breakdown. These graphs, with comments, are contained in Section III of this thesis.

We have chosen to look specifically at Supply ratings, both because these are of personal interest to this writer, and also with a view to reducing computation. Thus another computer program was written to extract data on individuals in the ratings assigned to the Supply Department. These specialized files were treated as described above

in order to create matrices for the same characteristics as were of interest for the total Navy. In addition, conditional matrices were created by age at enlistment, number of enlistments, and individual Supply rating. As before, percentage of advancement data was extracted from each matrix and plotted as total Supply for each breakdown. These graphs are also contained in Section III of this thesis.

III. RESULTS AND DISCUSSION

This section consists of tables and graphs exhibiting data obtained from the matrices created for each characteristic considered. For all submatrices considered there was in general less deviation from either the total Navy or total Supply figures in rates E5 thru E8 for any of the sub groupings than in ratings E1 thru E4. This would seem to indicate that factors affecting advancement in rates E1 thru E4 would be the area for most consideration and review. This is a logical area to explore since these are the rates associated with first enlistment. Slow advancement in these rates seems to have a definite affect on the decision to reenlist.

Tables 3 thru 11 list the data by characteristics considered, and Figures 1 thru 81 show the graphs plotted for the data. In each graph the solid plot is the variable listed first in the heading of the graph and the broken plot is the compared variable. For example, for the graph with the heading - Total Navy versus Total Supply, Figure 28 - the solid plot shows the advancement percentages for Total Navy and the broken plot is the corresponding percentage by rate for Total Supply.

In the pages that follow each characteristic considered is discussed and shown with its respective table of data and graphs.

A. TOTAL NAVY: RACE

Table 3 lists the advancement percentages for each race. This data is plotted in Figures 1 thru 5. It was observed that the advancement percentages of Caucasians nearly paralleled at all rates the percentages generated for total Navy. On further review of the data this was not surprising since 90.6 percent of the enlisted personnel were Caucasians.

Further review indicated that personnel of the Negroid and American Indian Races had significantly lower advancement rates than the overall Navy figures, while personnel in the Malayan and Mongolian Races were significantly above in the lower two rates with Malayans dropping below average in rates E3 and E4. With the exception of American Indians, who were below total figures, and Mongolian who were above in two and below in two, personnel of other races nearly paralleled the total figures for rates E5 thru E8.

B. TOTAL NAVY: EDUCATION

Table 4 lists the advancement percentages for years of education from 6 to 18 years for total Navy. This data is plotted in Figures 6 thru 18.

It was observed that there was a decided increase in advancement percentage in rates E1 thru E4 for personnel with 12 or more years of education. For rates E5 personnel with 12 or fewer years of education showed a higher percentage of advancement. For rates E6 thru E8.

ADVANCEMENT PERCENTAGES FOR TOTAL NAVY BY RACE
(number of data points in each group)

Rate / Race	E1	E2	E3	E4	E5	E6	E7	E8
0	66 (17502)	54 (70430)	35 (134679)	23 (138954)	8 (101585)	6 (73626)	6 (37984)	8 (9213)
1	59 (2509)	32 (8590)	16 (8340)	17 (4060)	10 (4871)	6 (5634)	4 (2120)	6 (272)
2	52 (102)	33 (308)	22 (325)	13 (173)	10 (164)	2 (137)	2 (47)	0 (4)
3	84 (218)	66 (922)	25 (8645)	15 (3277)	9 (3474)	8 (4038)	4 (1495)	8 (154)
4	79 (34)	58 (136)	37 (303)	23 (308)	4 (199)	16 (80)	2 (46)	11 (9)

Table 3

Race Code	Race	Percentages of total
0	Caucasian	90.6
1	Negroid	5.6
2	American Indian	.2
3	Malayan	3.4
4	Mongolian	.2

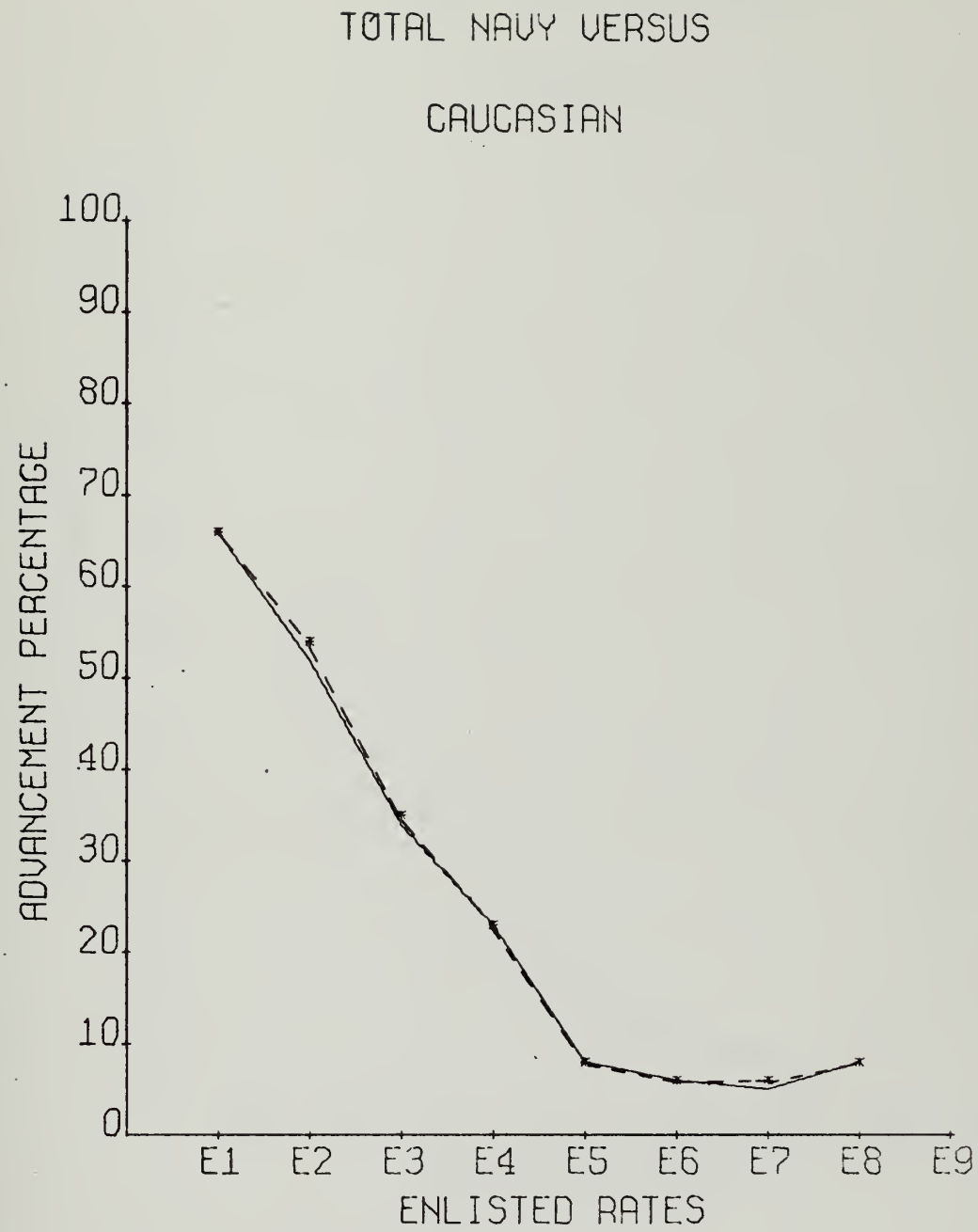
TOTAL NAVY VERSUS
CAUCASIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 1

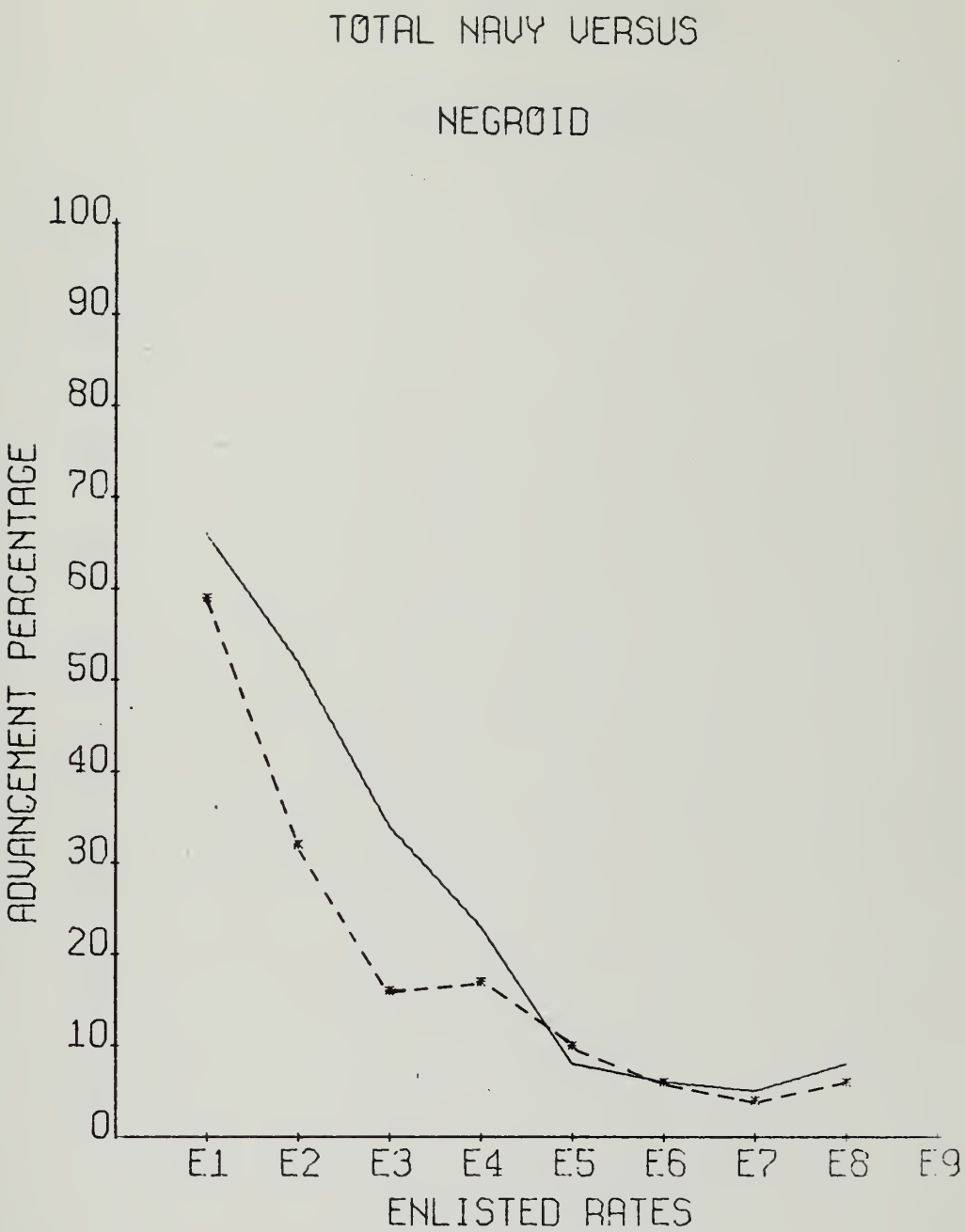
TOTAL NAVY VERSUS
NEGROID
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 2

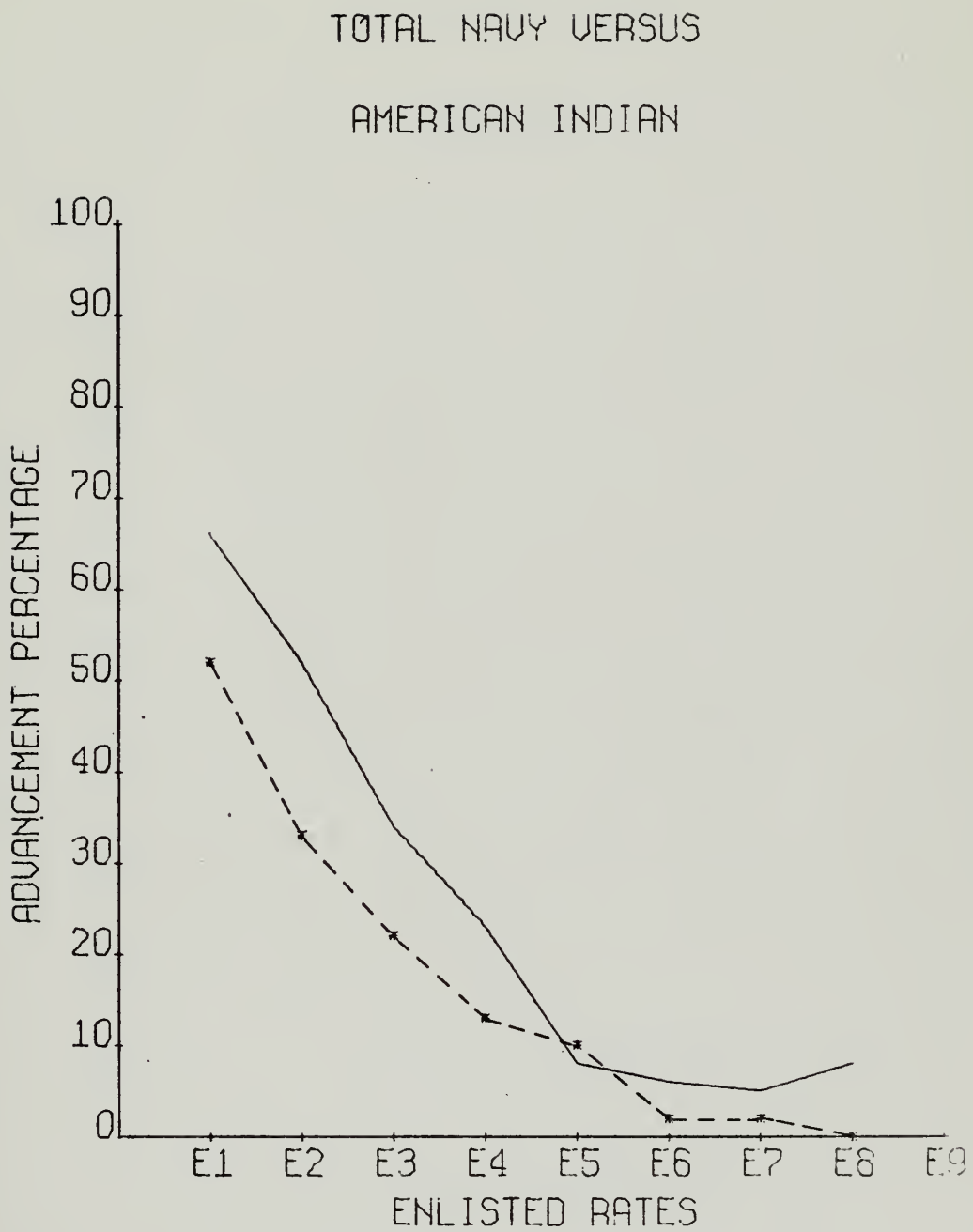
TOTAL NAVY VERSUS
AMERICAN INDIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 3

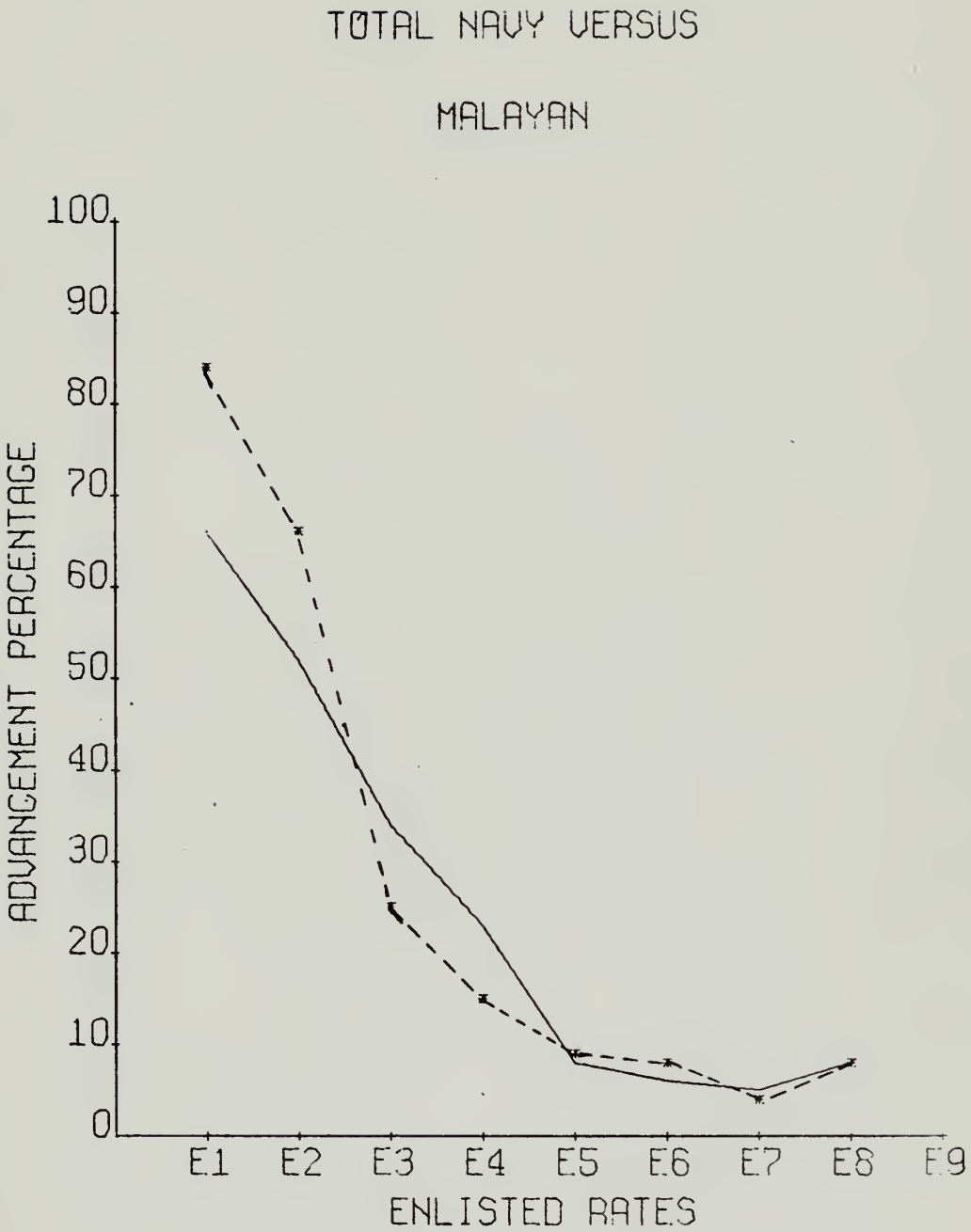
TOTAL NAVY VERSUS
MALAYAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 4

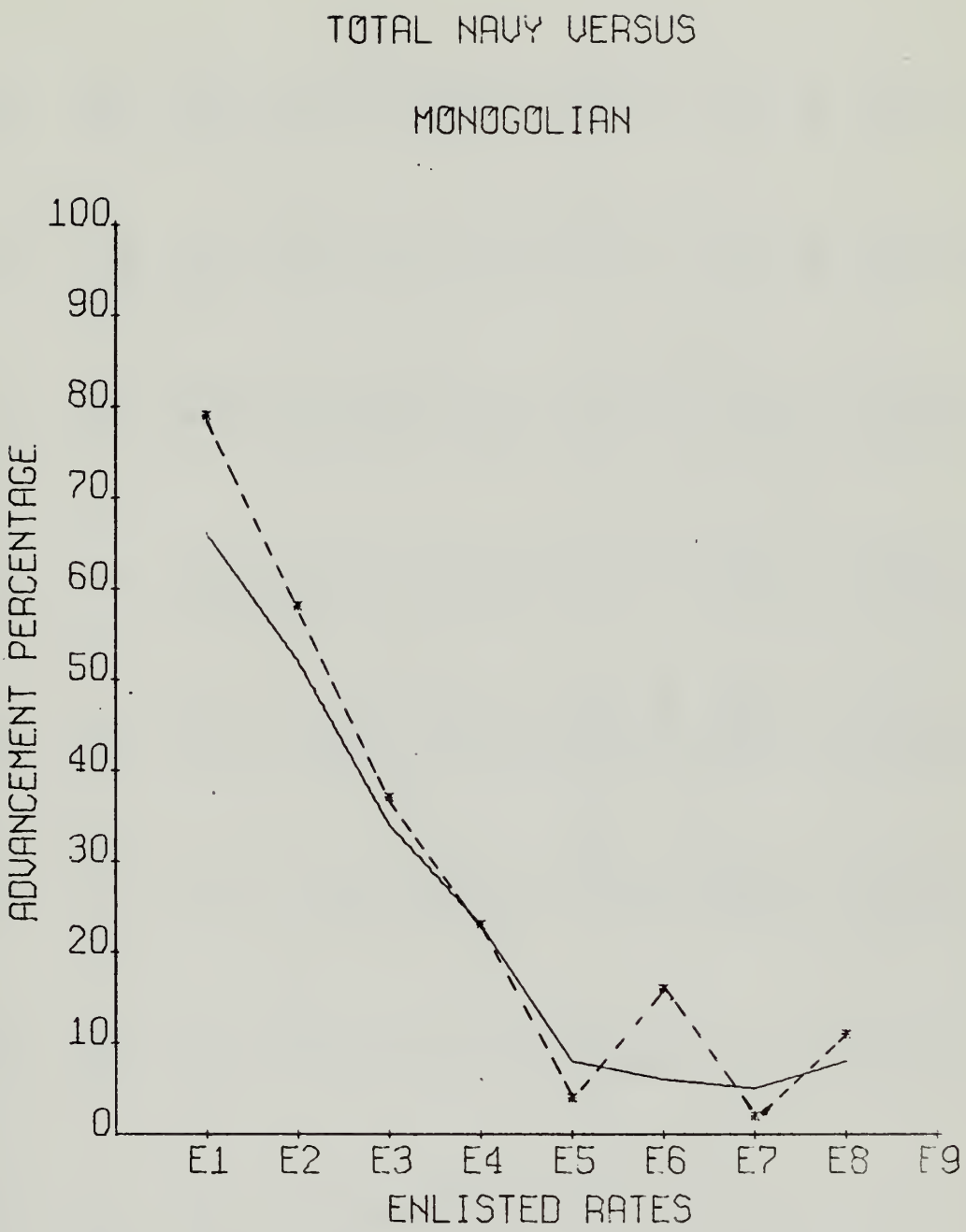
TOTAL NAVY VERSUS
MONGOLIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 5

ADVANCEMENT PERCENTAGES FOR TOTAL NAVY BY YEARS OF EDUCATION
(number of data points in each group)

Rate / Years	E1	E2	E3	E4	E5	E6	E7	E8
6	45 (20)	10 (107)	3 (61)	17 (23)	8 (74)	3 (68)	0 (32)	25 (4)
7	45 (106)	20 (441)	9 (300)	10 (222)	10 (686)	5 (1298)	3 (697)	4 (127)
8	47 (704)	23 (2103)	11 (1327)	16 (859)	10 (2287)	5 (3973)	3 (2325)	8 (429)
9	55 (1848)	29 (4841)	13 (3007)	16 (1682)	12 (3798)	6 (6622)	3 (3614)	8 (681)
10	56 (3126)	34 (7631)	17 (5694)	16 (3550)	11 (7015)	6 (11333)	4 (5935)	7 (1246)
11	58 (2695)	39 (7480)	19 (7413)	17 (4669)	12 (6004)	6 (8769)	6 (4573)	7 (1006)
12	72 (11176)	59 (53495)	33 (107929)	20 (99574)	8 (62661)	6 (44993)	6 (22010)	8 (5436)
13	75 (470)	69 (3385)	44 (12267)	27 (17159)	6 (13014)	7 (3737)	7 (1501)	9 (434)
14	81 (133)	59 (531)	44 (7085)	31 (10030)	5 (9056)	6 (1819)	4 (696)	8 (198)
15	58 (43)	57 (155)	44 (2345)	32 (3271)	5 (3124)	5 (577)	5 (183)	6 (54)
16	63 (35)	64 (175)	50 (4442)	42 (5245)	3 (2355)	4 (257)	5 (110)	9 (32)
17	0 (1)	50 (8)	58 (274)	41 (357)	4 (135)	0 (28)	0 (6)	0 (2)
18	100 (1)	50 (2)	51 (114)	43 (94)	2 (50)	0 (13)	50 (2)	0 (3)

Table 4

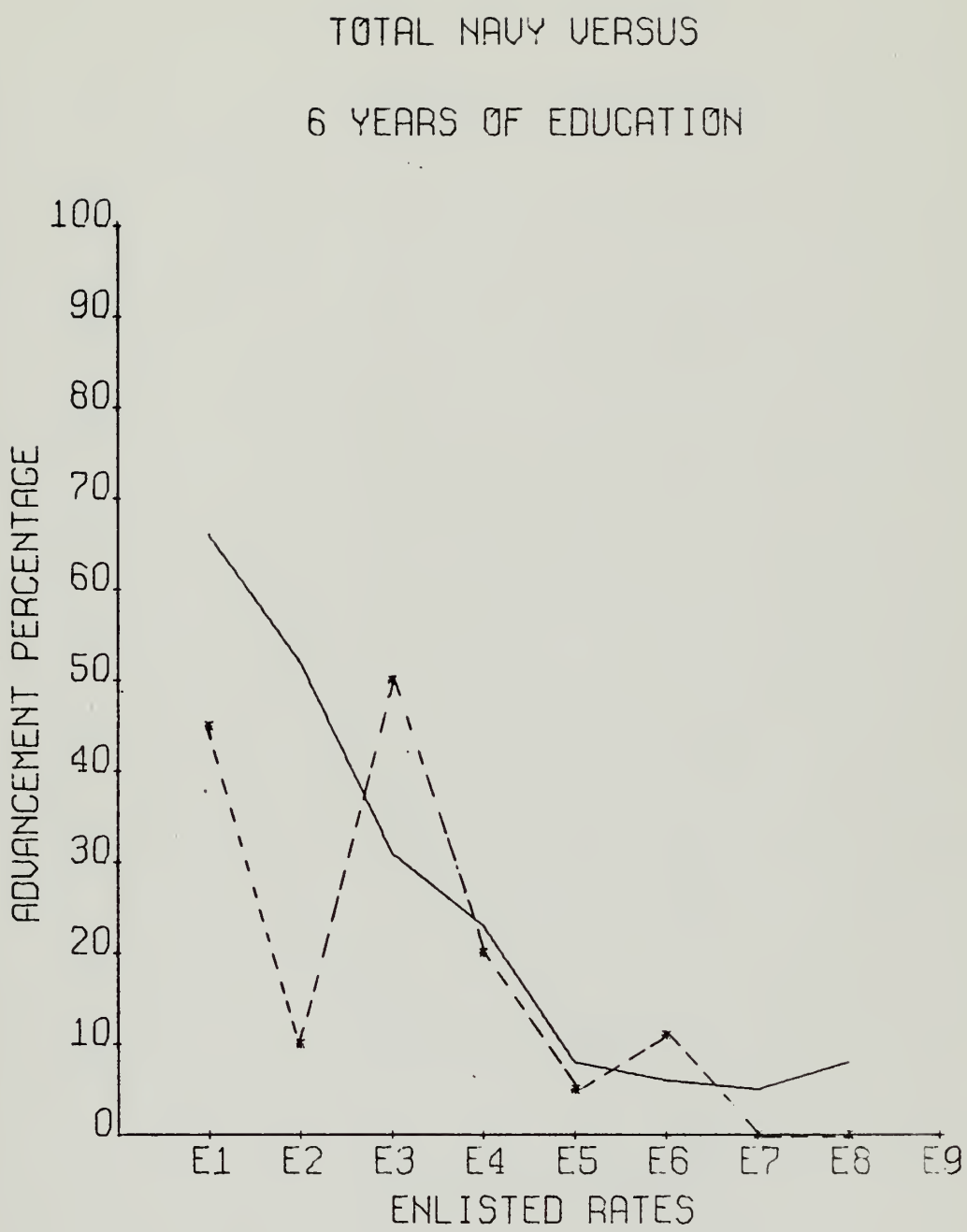
TØTAL NAVY VERSUS
6 YEARS ØF EDUCATIØN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 6

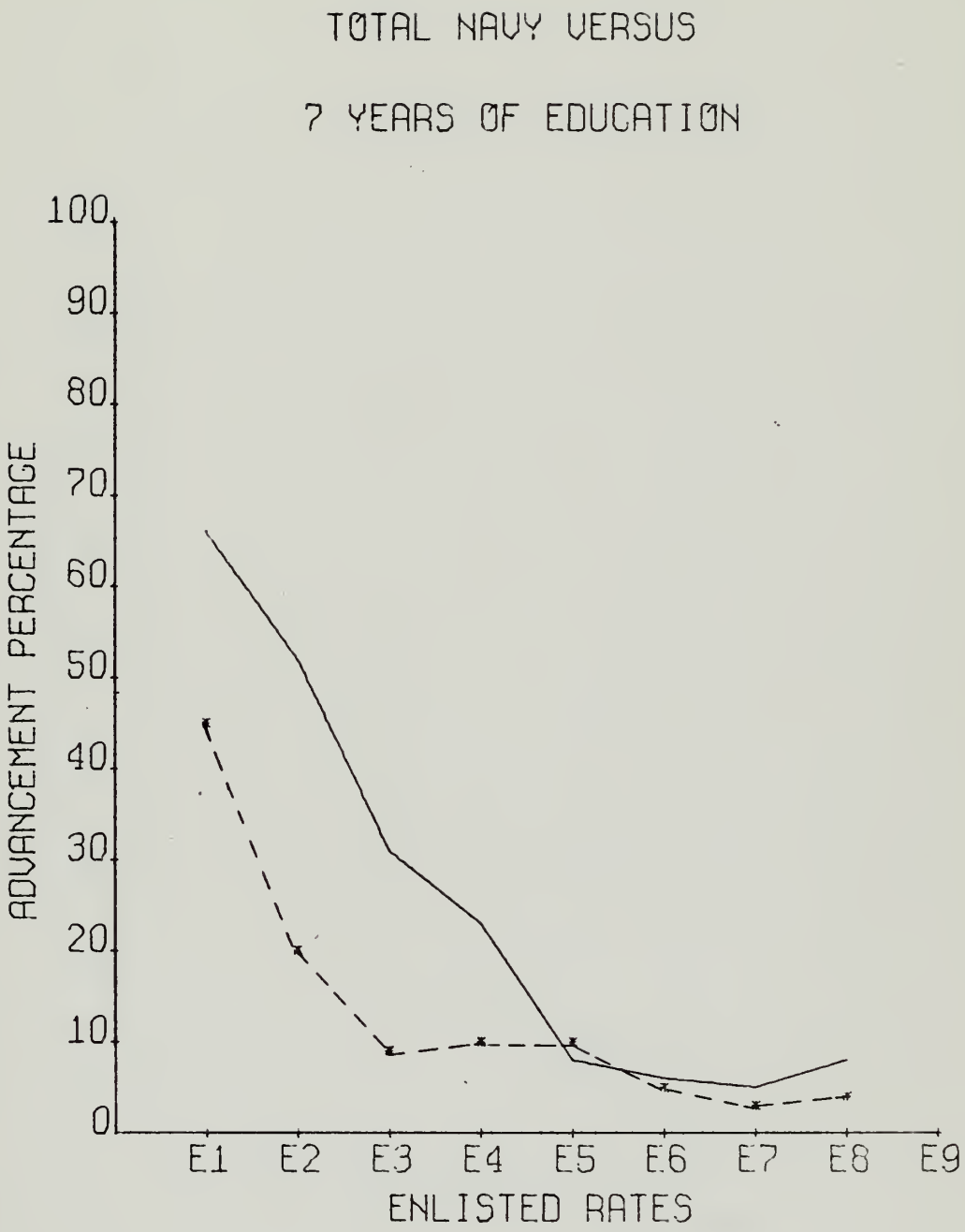
TØTAL NAVY VERSUS
7 YEARS ØF EDUCATIØN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 7

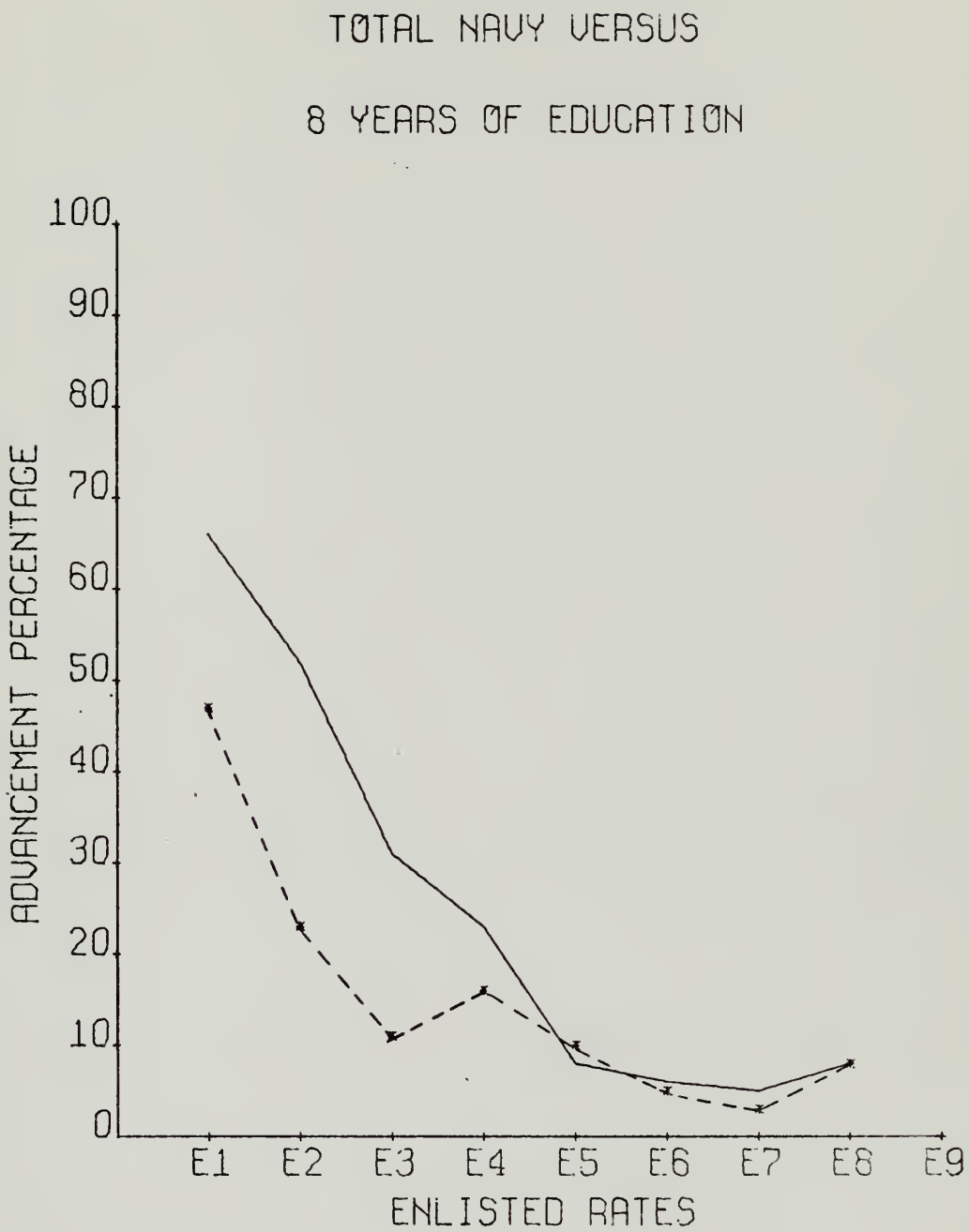
TOTAL NAVY VERSUS
8 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 8

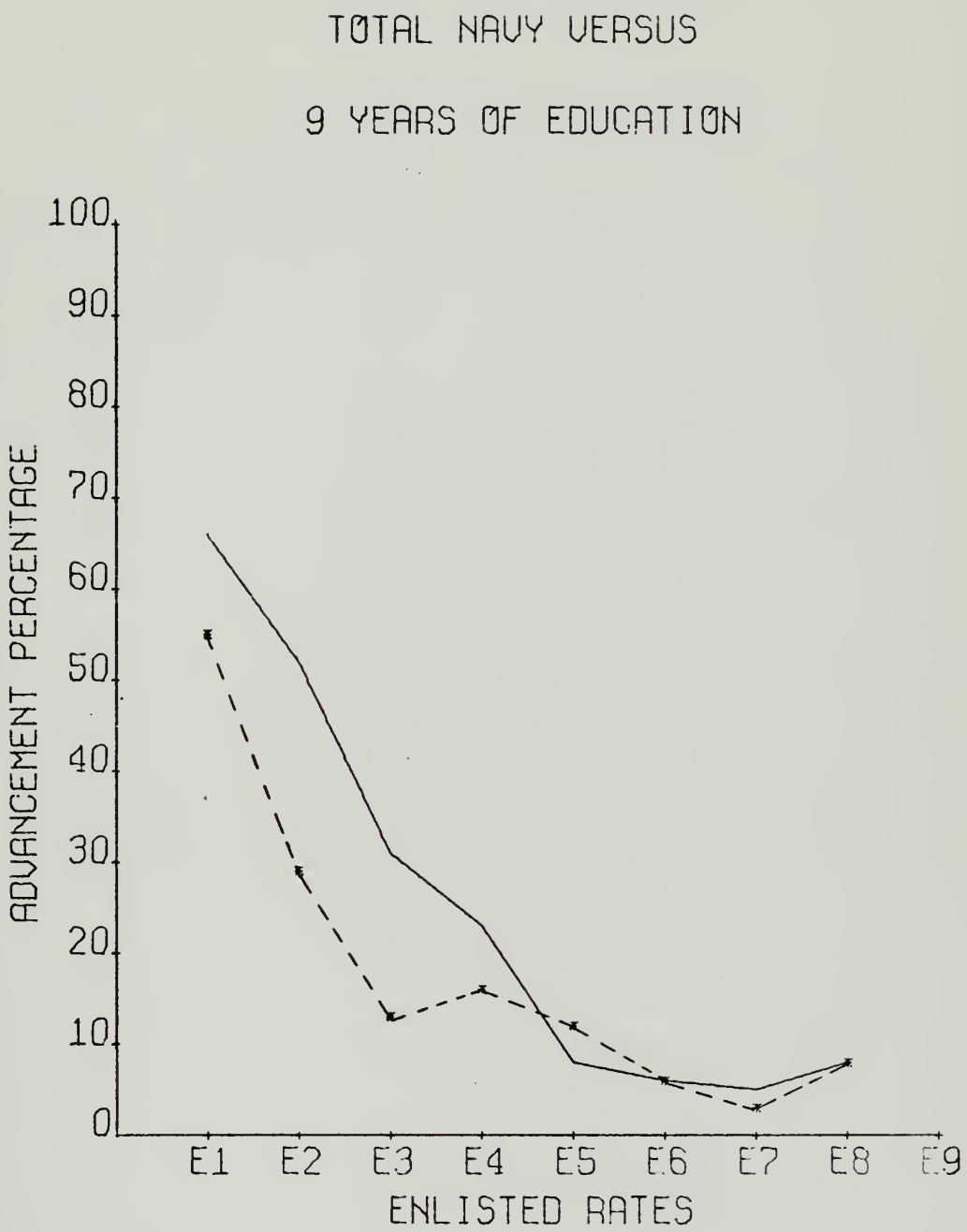
TOTAL NAVY VERSUS
9 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 9

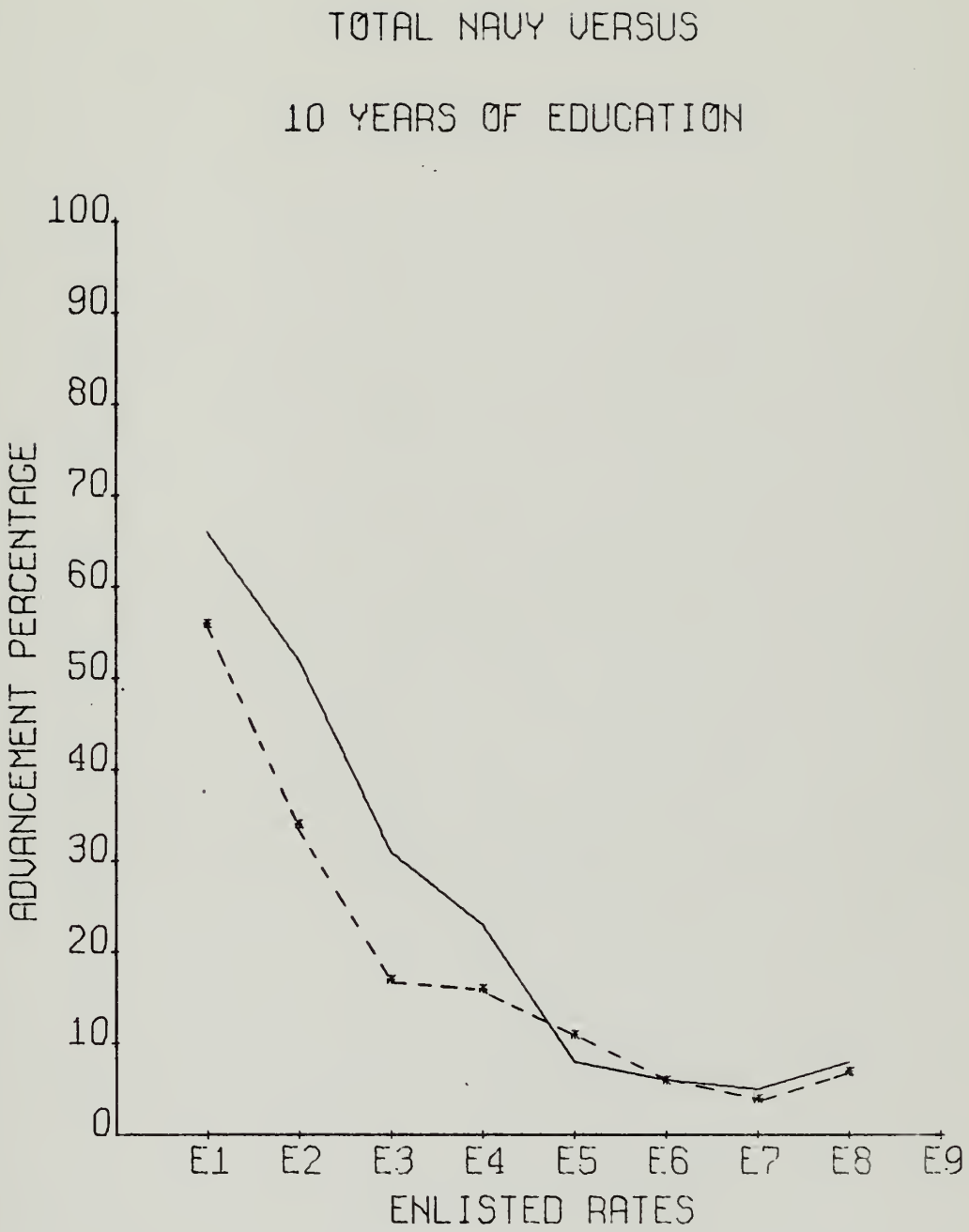
TOTAL NAVY VERSUS
10 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 10

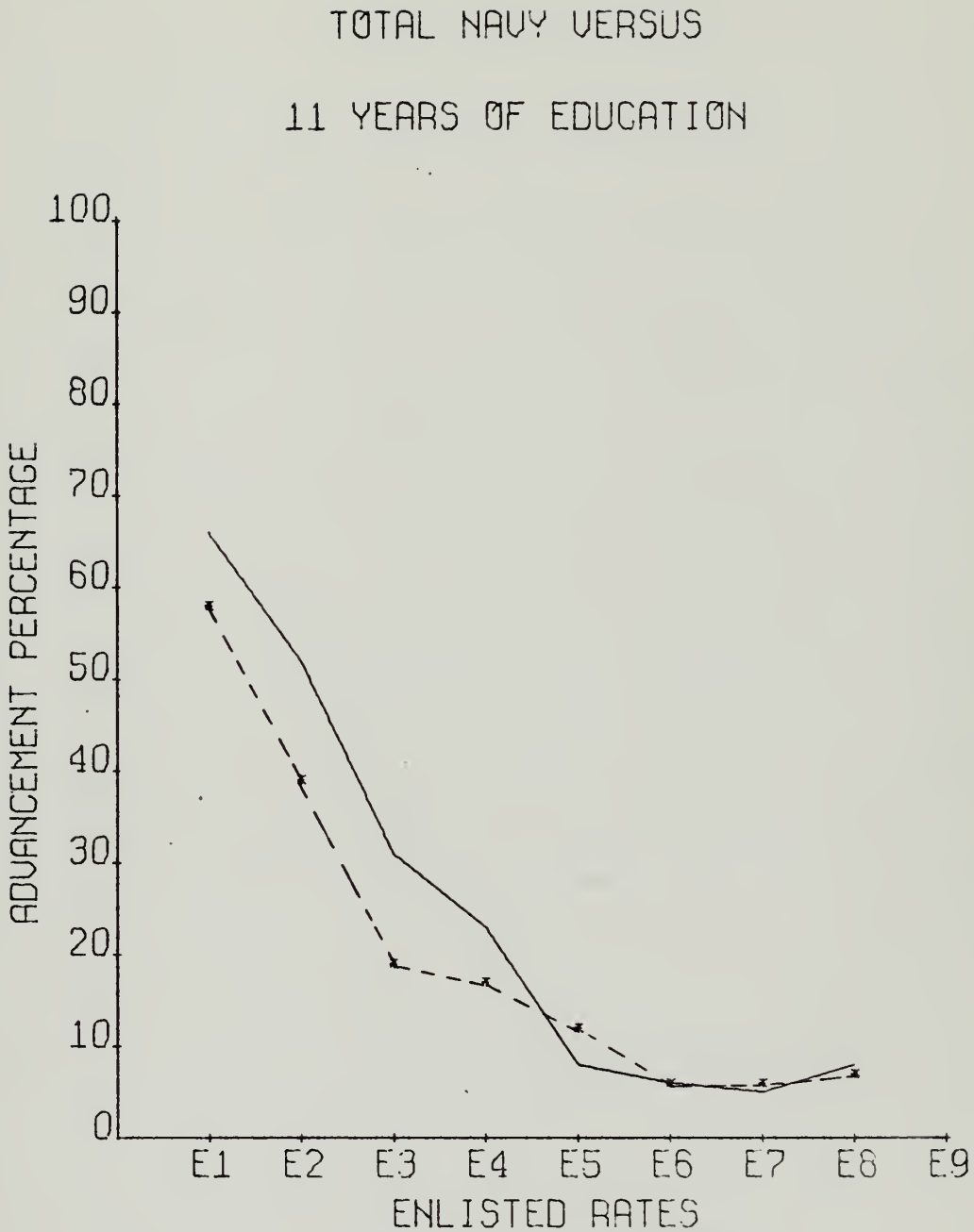
TOTAL NAVY VERSUS
11 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 11

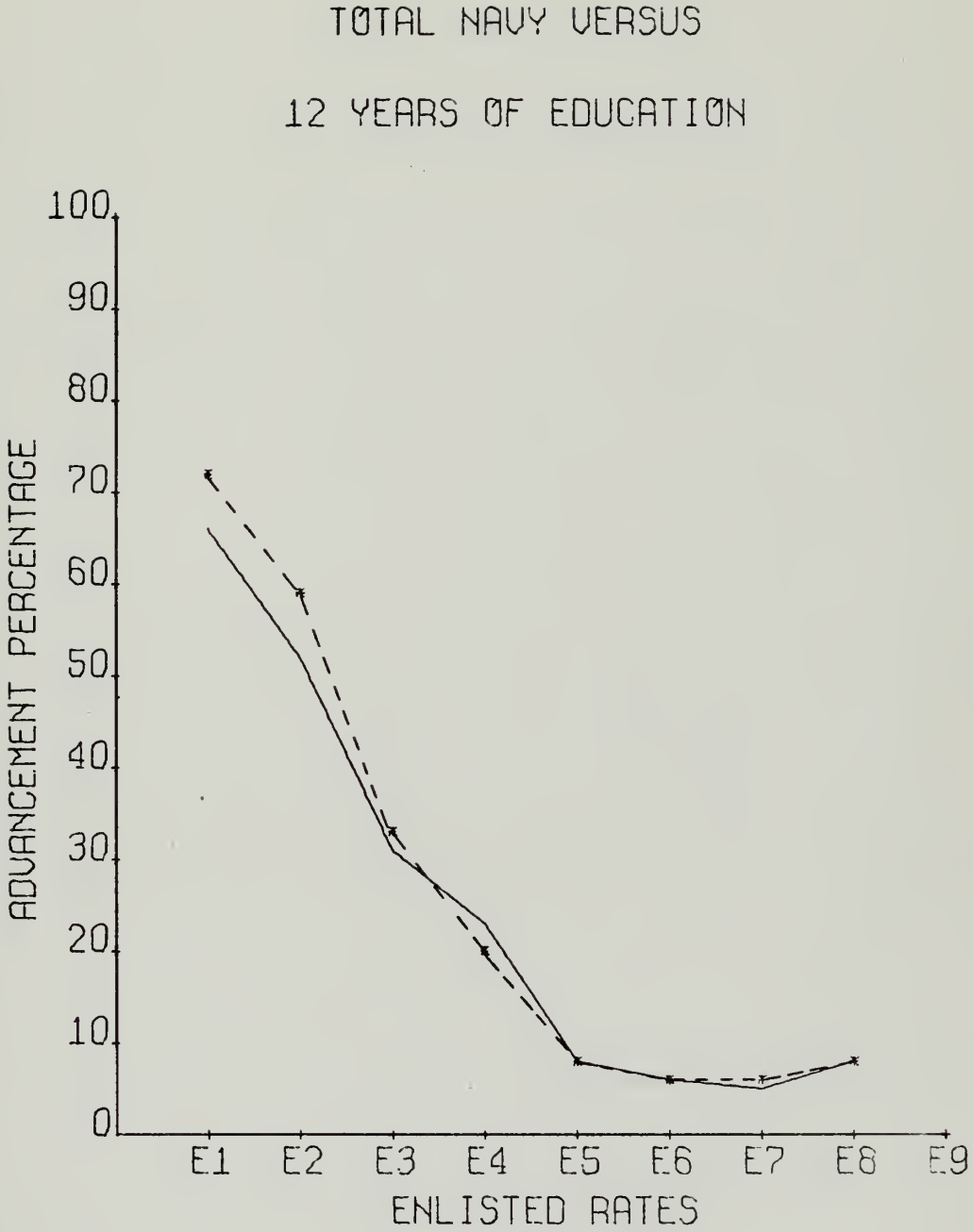
TOTAL NAVY VERSUS
12 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 12

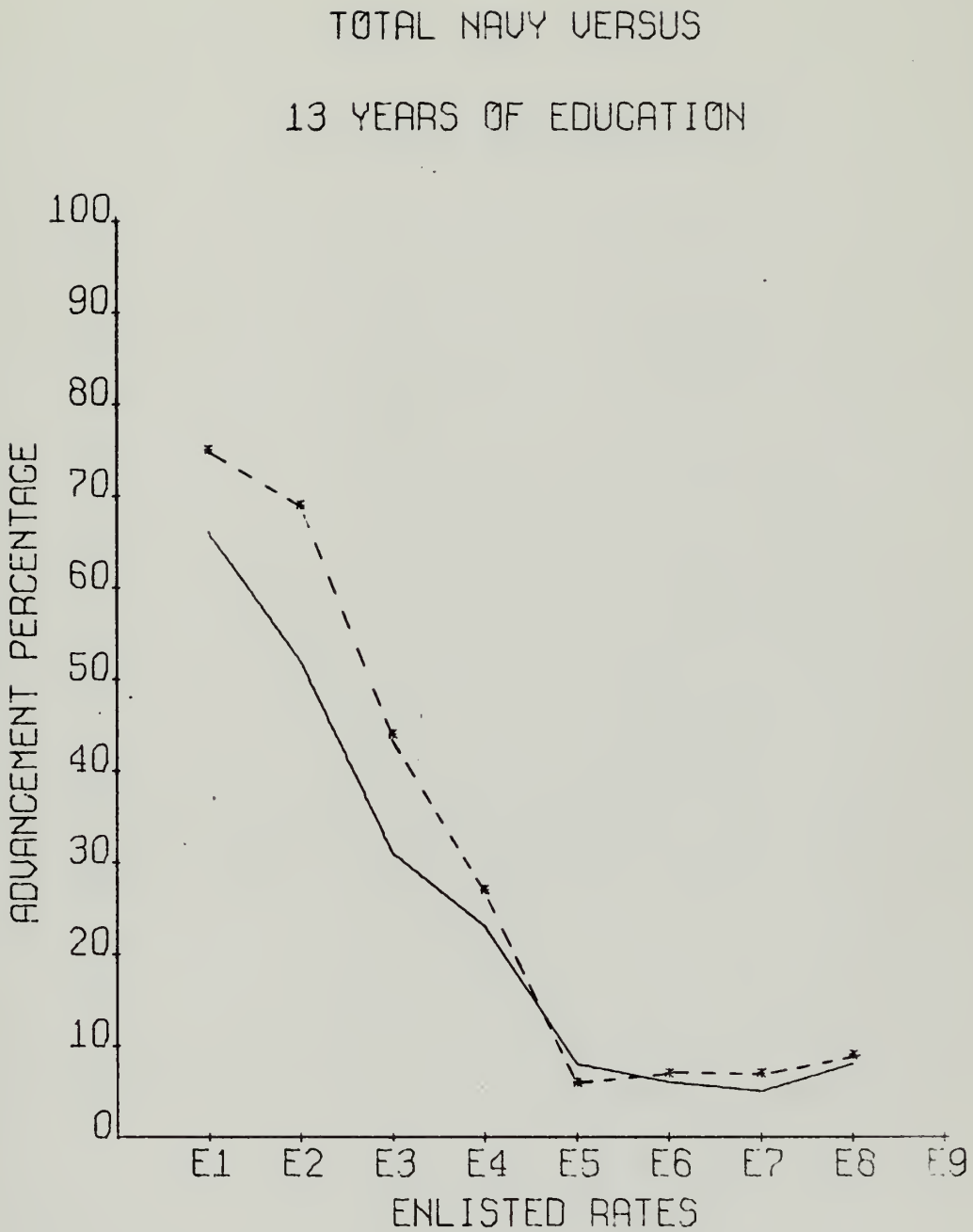
TOTAL NAVY VERSUS
13 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 13

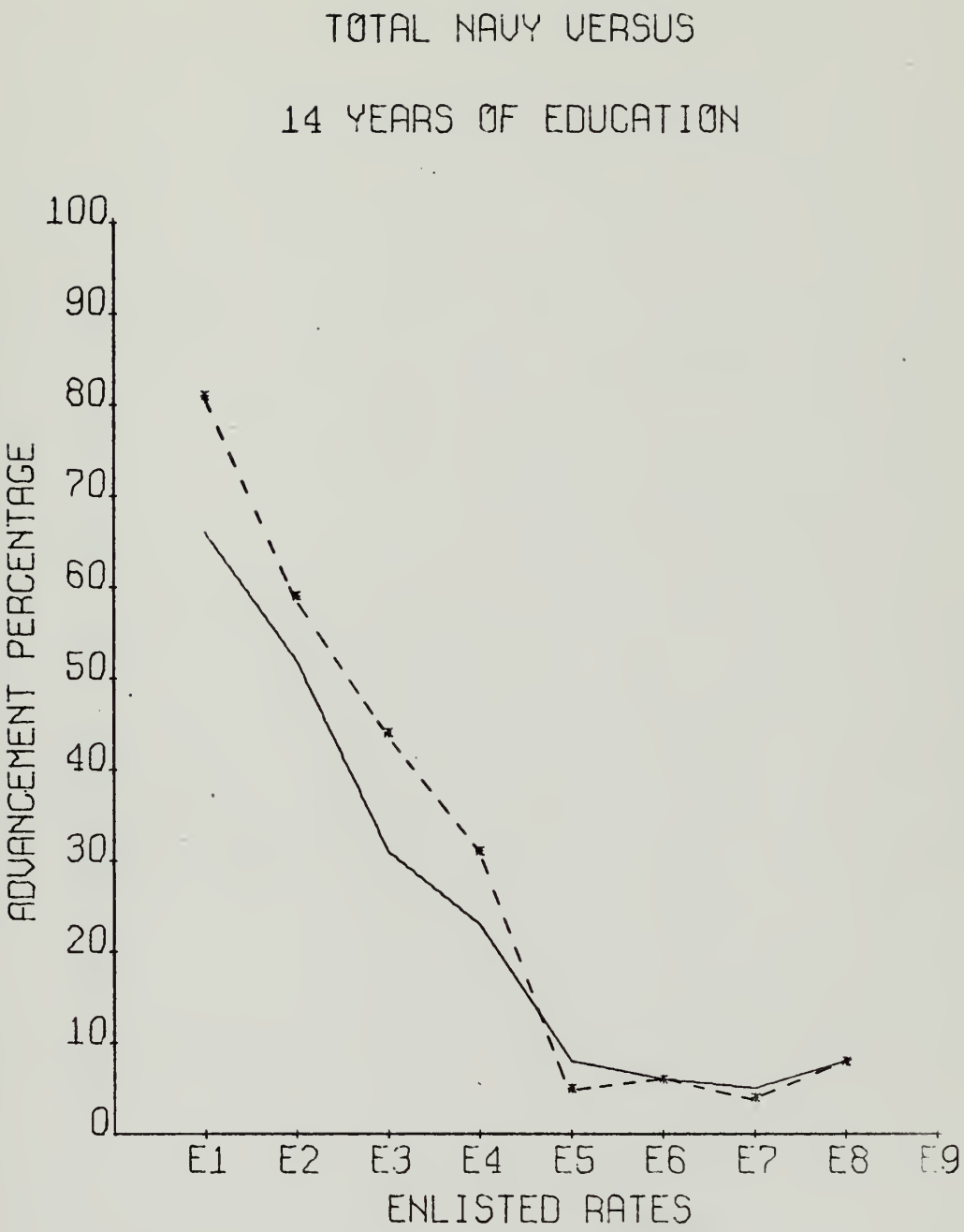
TOTAL NAVY VERSUS
14 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 14

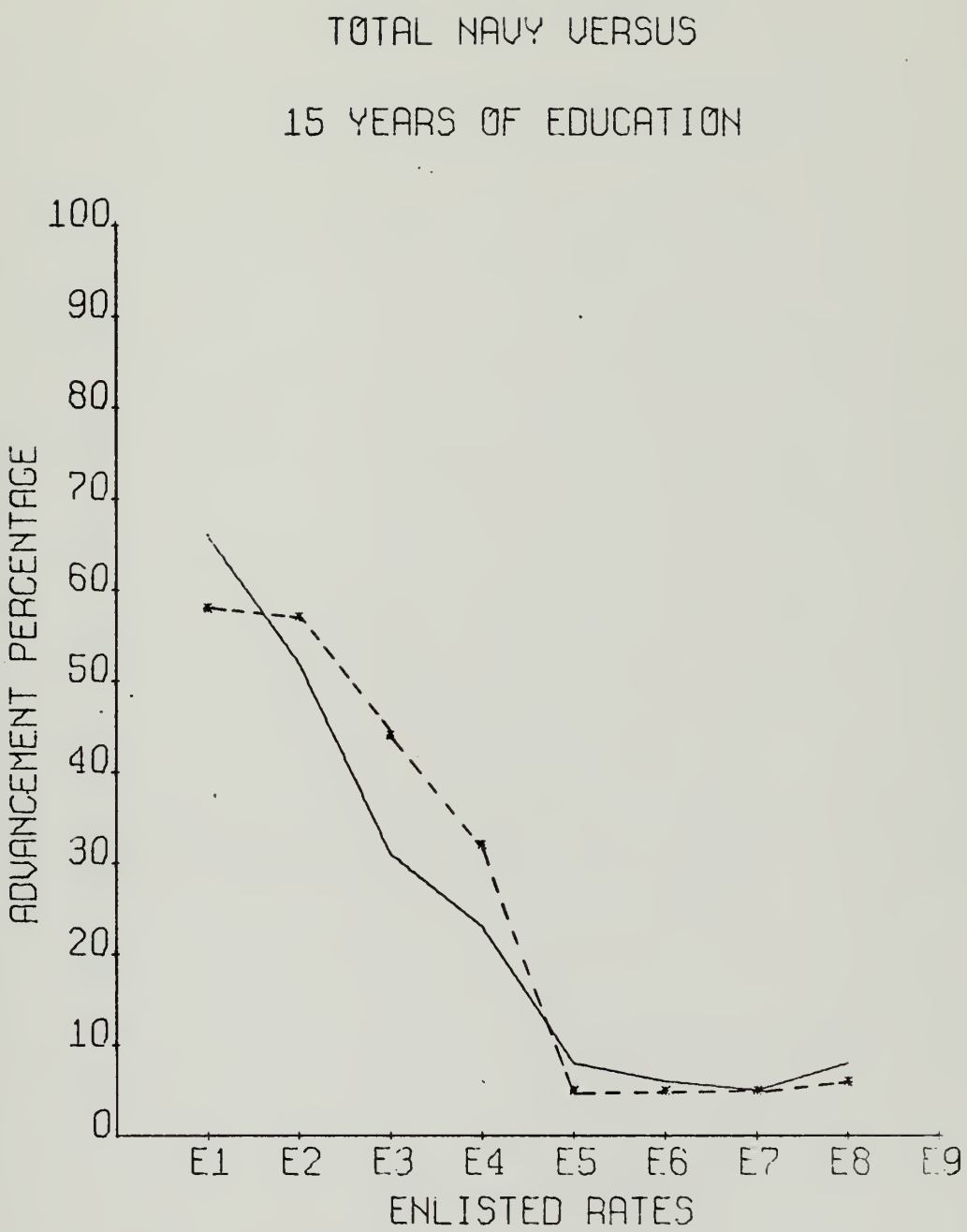
TOTAL NAVY VERSUS
15 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 15

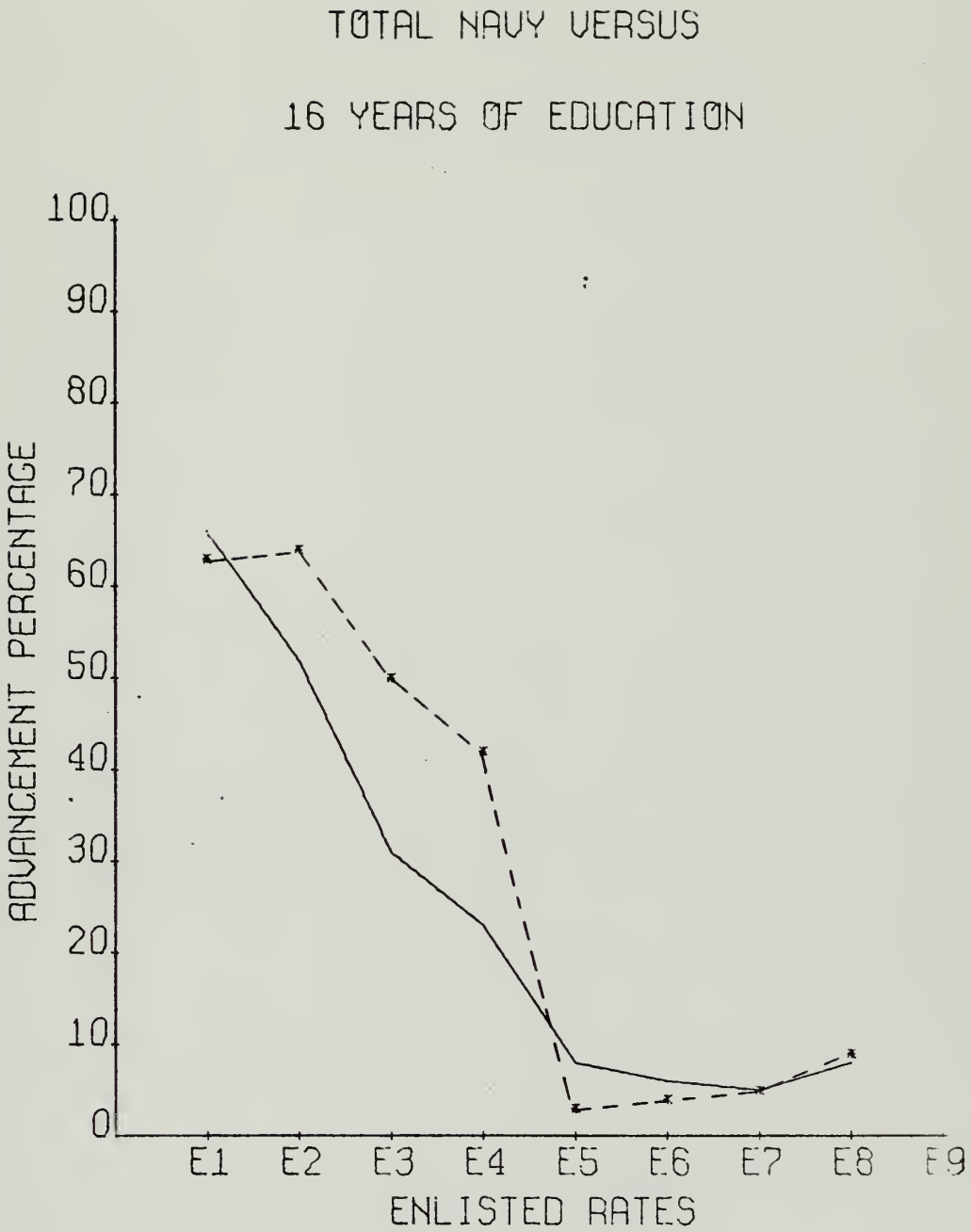
TOTAL NAVY VERSUS
16 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 16

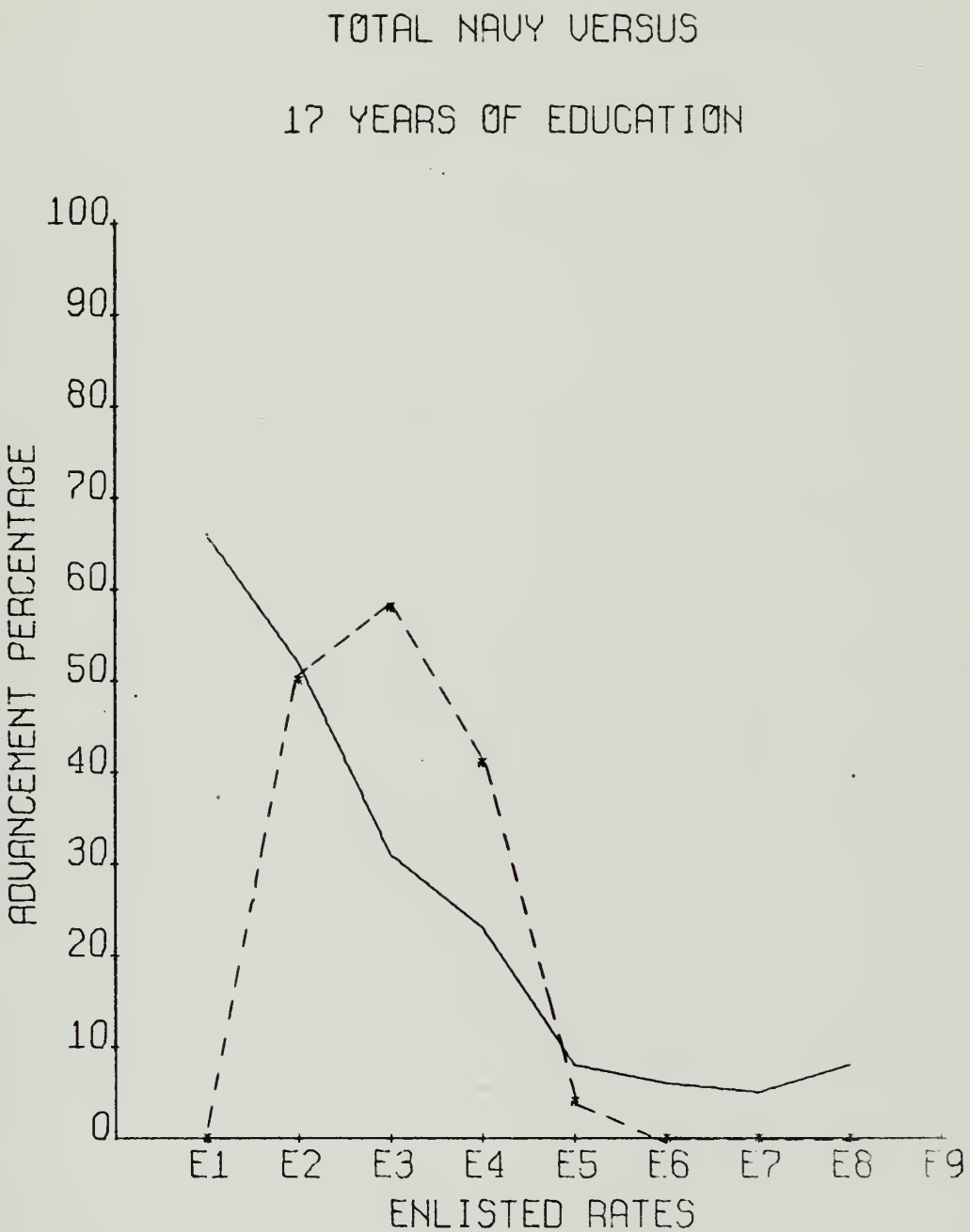
TØTAL NAVY VERSUS
17 YEARS ØF EDUCATIØN
100
90
80
70
60
50
40
30
20
10
0
ADVANCEMENT PERCENTAGE
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 17

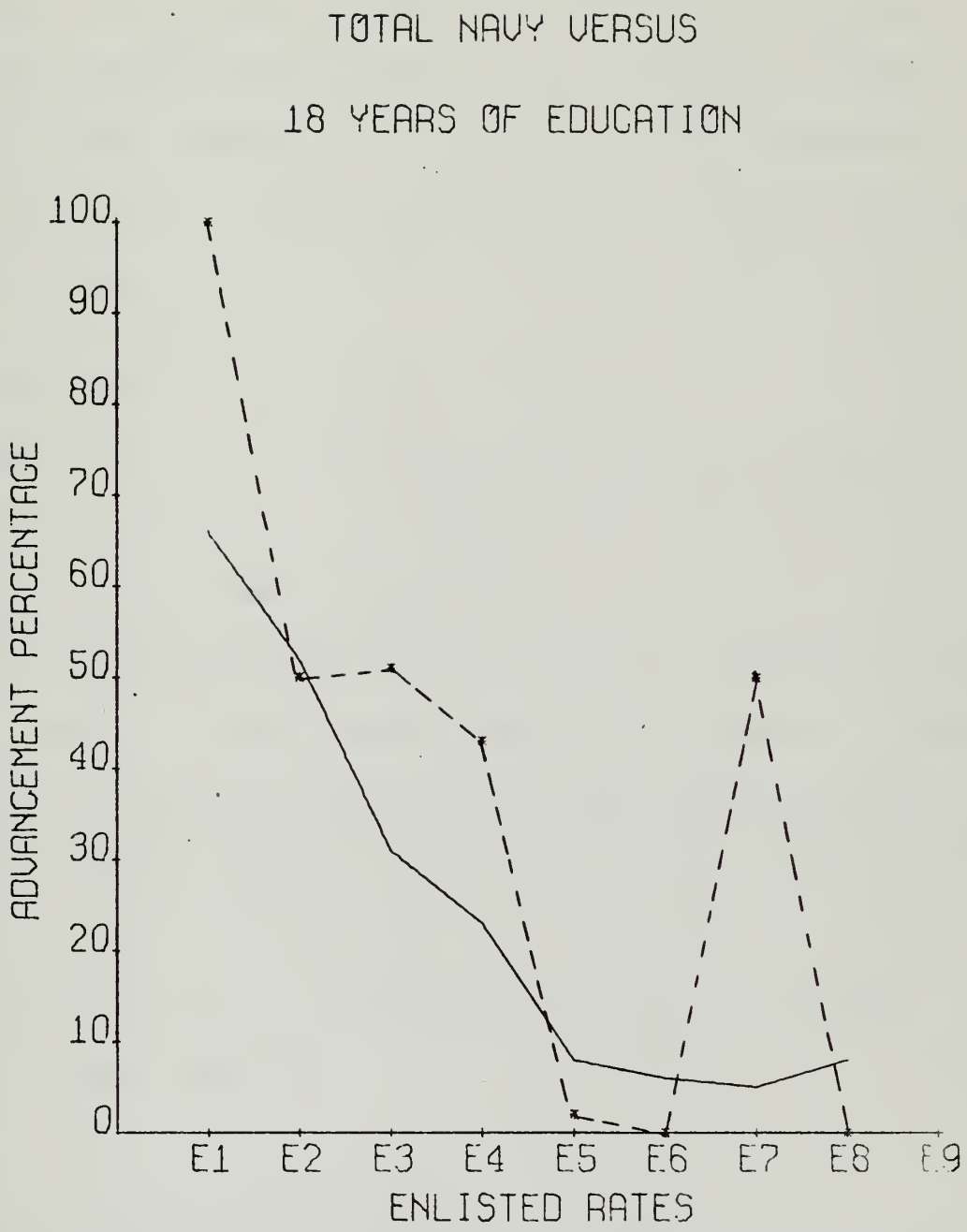
TOTAL NAVY VERSUS
18 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 18

education level does not appear to strongly influence advancement rate. This might reflect the fact that fewer personnel with over 12 years of education remain in the Navy after the initial enlistment, leaving a greater or equal opportunity for advancement to those with under 12 years of education. A certain percentage with over 12 years of service would be shown as leaving the Navy when in fact they remain as officers.

C. TOTAL NAVY: OCCUPATIONAL GROUP

Table 5 lists the advancement percentages for each occupational group listed in Appendix A. This data is plotted in Figures 19 thru 27.

It was observed that occupational groups two, four, five, and six nearly paralleled at all rates the percentages generated for Total Navy. Group zero showed a significantly lower advancement percentage in the four lower rates than any other group, while group three was higher for these same rates. Group one was loser for rates E1 and E2 and higher for rates E4 thru E7. Groups three and seven were the only groups which were consistently lower than the total Navy figures in rates E5 thru E8.

D. TOTAL NAVY: TOTAL SUPPLY

Table 6 lists the advancement percentages for Total Navy versus Total Supply. This data is plotted in Figure 28.

It was observed that, with the exception of rates E1 and E2, personnel assigned to the supply ratings had a lower chance for advancement than did the average Navy man.

ADVANCEMENT PERCENTAGES FOR TOTAL NAVY BY OCCUPATIONAL GROUPS

(number of data points in each group

Rate Group	E1	E2	E3	E4	E5	E6	E7	E8
0	43 (251)	42 (1196)	25 (4025)	18 (7798)	9 (4160)	9 (4387)	2 (2883)	7 (586)
1	62 (2221)	43 (8374)	34 (19136)	28 (24026)	12 (21166)	10 (12500)	10 (5890)	9 (1668)
2	64 (1903)	53 (9816)	35 (18969)	26 (16273)	8 (11713)	6 (9844)	3 (4988)	6 (1085)
3	71 (6695)	59 (22882)	38 (19933)	30 (8501)	6 (5436)	4 (4445)	3 (2691)	6 (607)
4	65 (377)	54 (1247)	33 (2251)	23 (2521)	7 (2372)	6 (1633)	6 (653)	7 (192)
5	64 (1751)	51 (7659)	34 (20406)	24 (18278)	8 (13372)	7 (11286)	6 (5879)	8 (1233)
6	63 (4803)	50 (18809)	35 (42593)	19 (50091)	7 (37957)	4 (28121)	5 (14013)	9 (3214)
7	65 (1709)	48 (6335)	29 (12173)	21 (11941)	4 (6855)	4 (5439)	4 (2931)	5 (626)
8	68 (655)	54 (4068)	25 (12806)	12 (7343)	5 (7262)	6 (5860)	8 (1764)	6 (441)

Table 5

Occupational Group Code	Title
0	Gun Crews and Seamanship Specialists
1	Electronic Equipment Repairmen
2	Communications and Intelligence Specialists
3	Medical and Dental Specialists
4	Other Technical and Allied Specialists
5	Administrative Specialists and Clerks
6	Electrical/Mechanical Equipment Repairmen
7	Craftsmen
8	Services and Supply Handlers

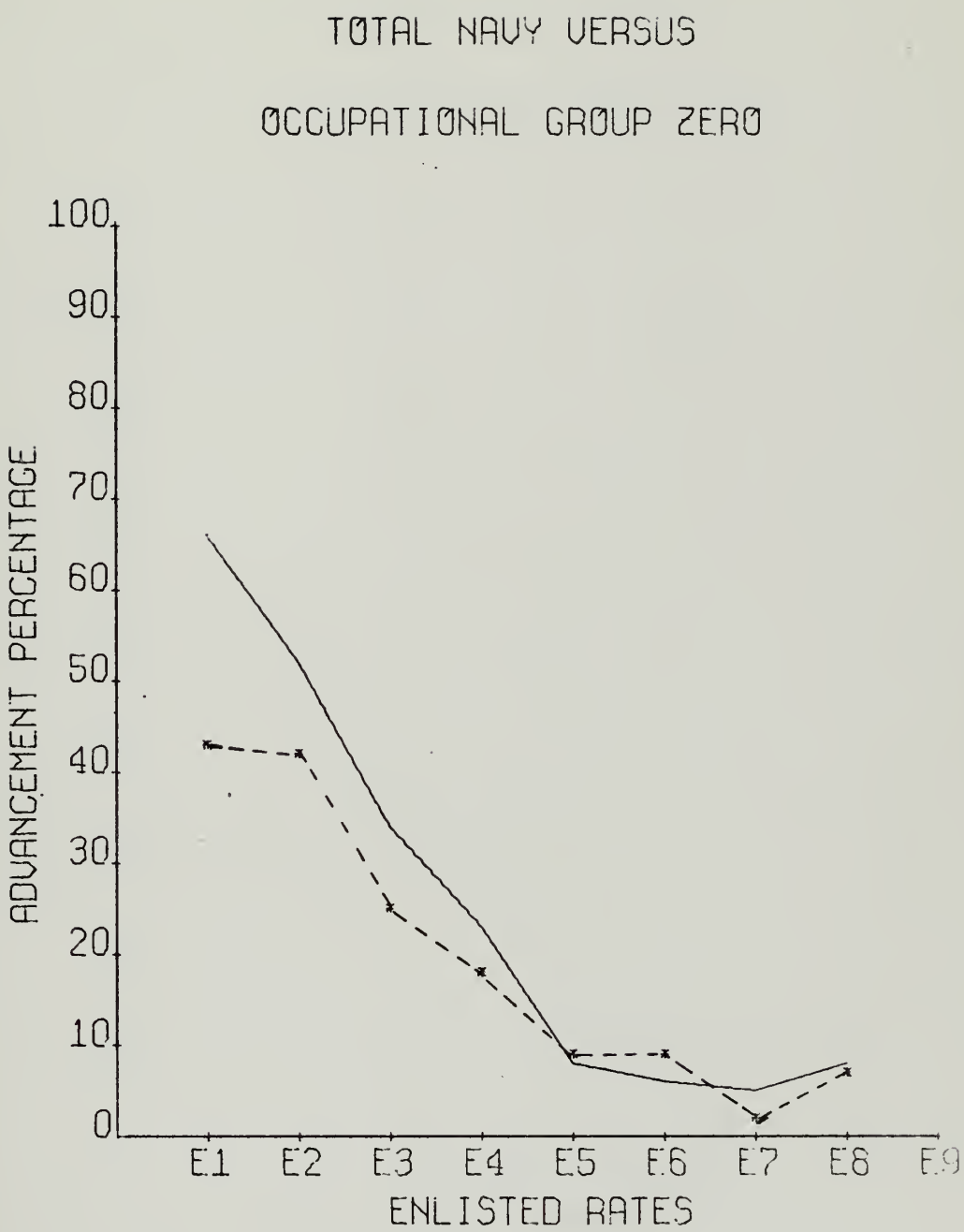
TØTAL NAVY VERSUS
ØCCUPATIØNAL GRØUP ZERØ
100
90
80
70
60
50
40
30
20
10
0
ADVANCEMENT PERCENTAGE
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 19

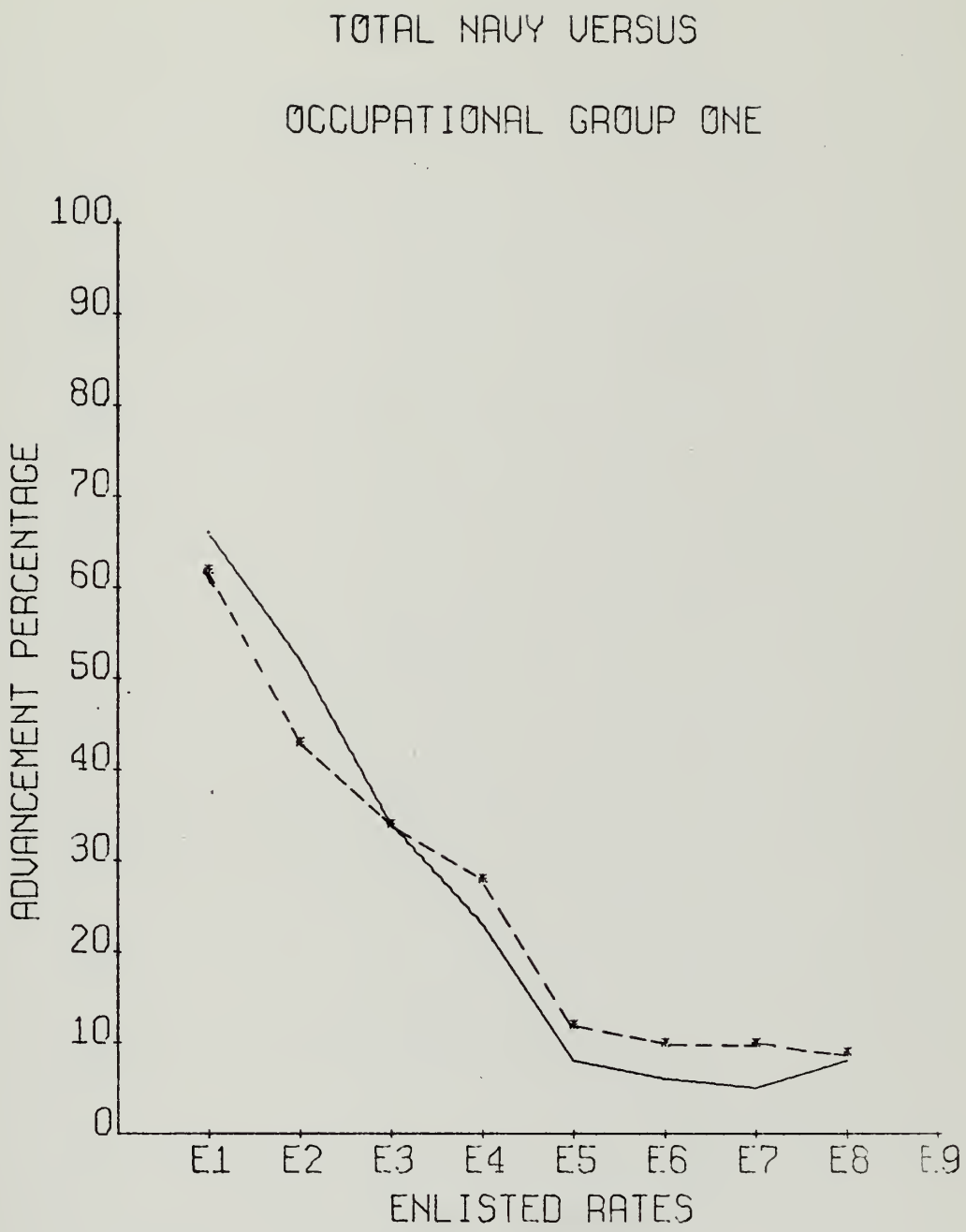
TOTAL NAVY VERSUS
OCCUPATIONAL GROUP ONE
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 20

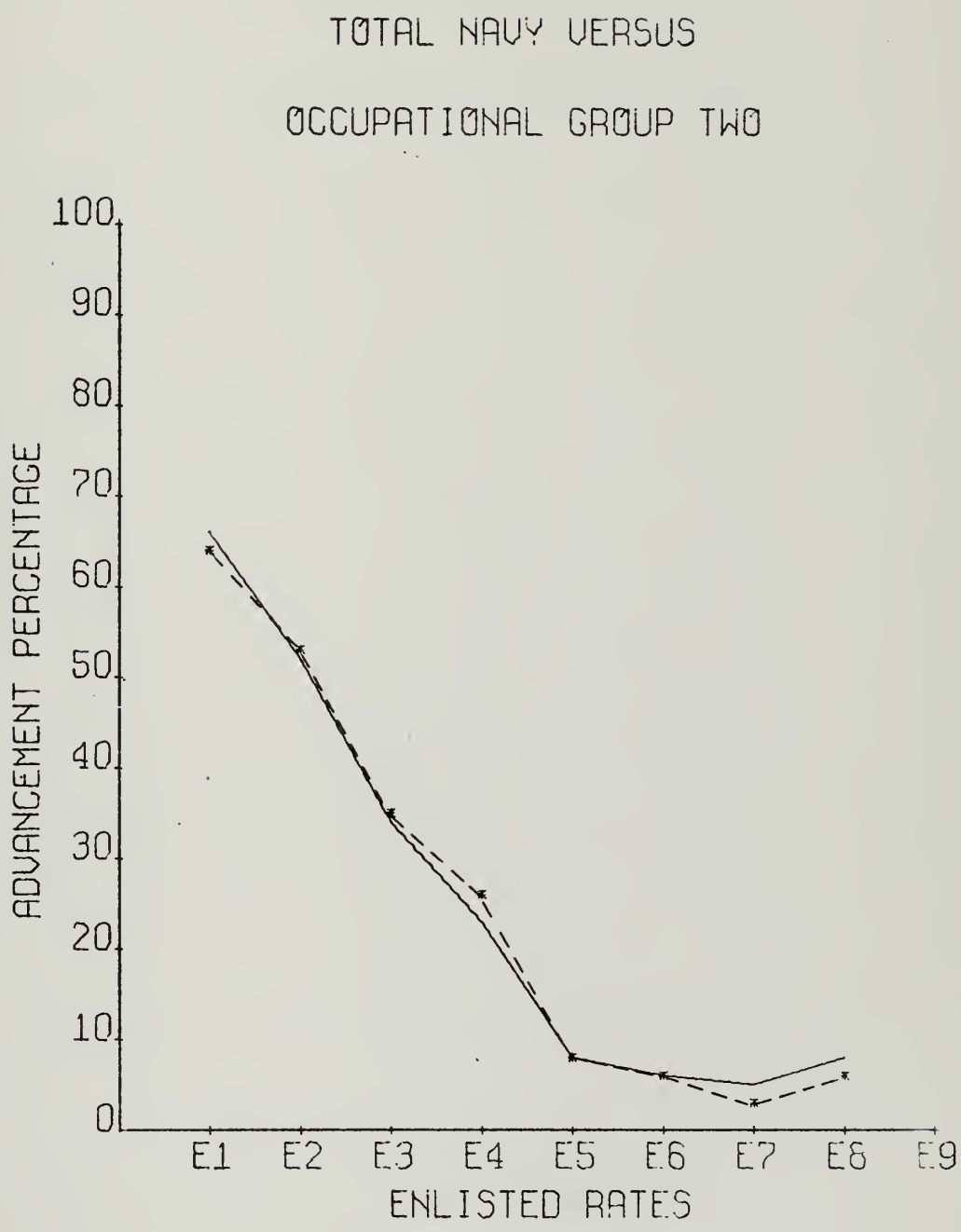
TOTAL NAVY VERSUS
OCCUPATIONAL GROUP TWO
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 21

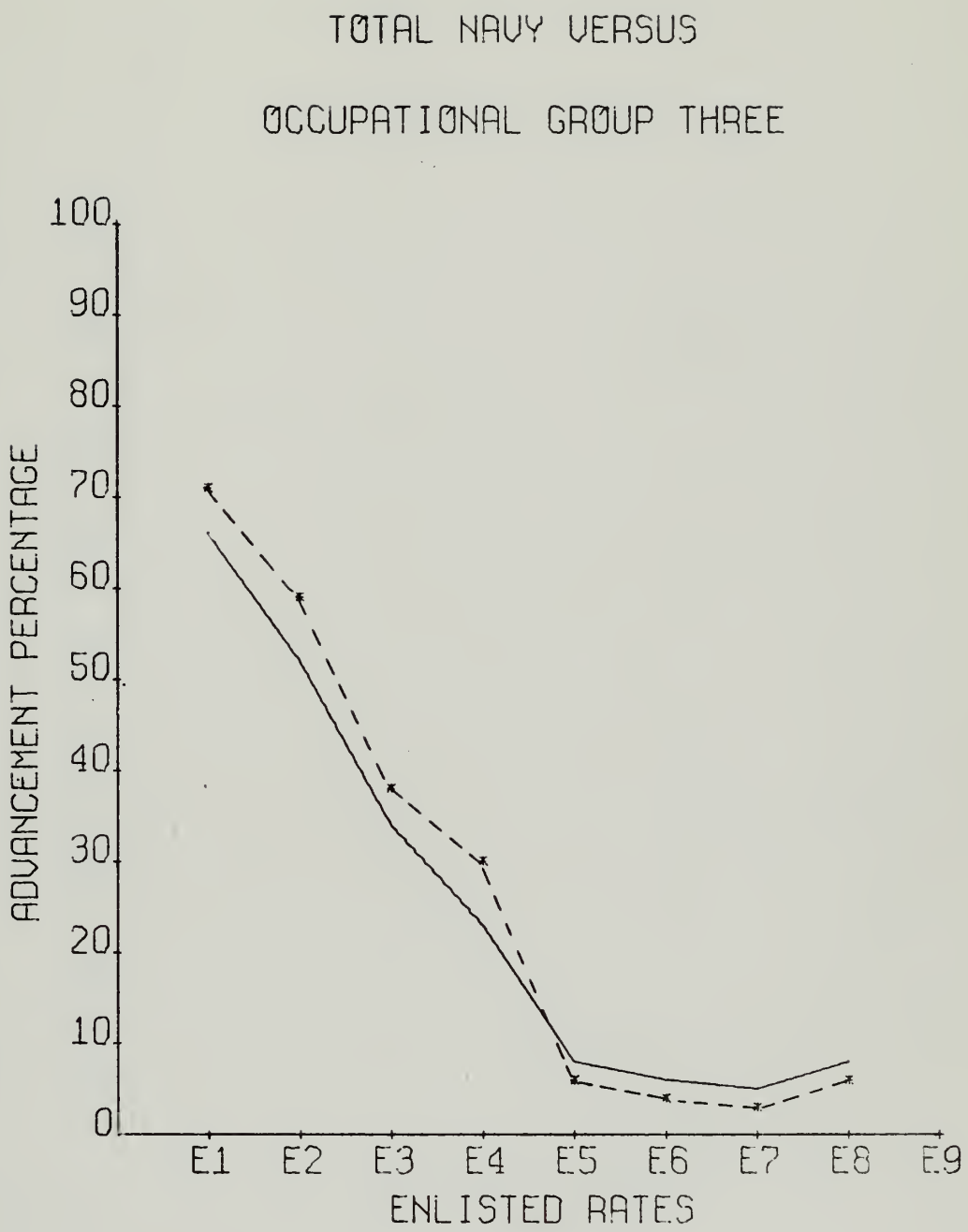
TOTAL NAVY VERSUS
OCCUPATIONAL GROUP THREE
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 22

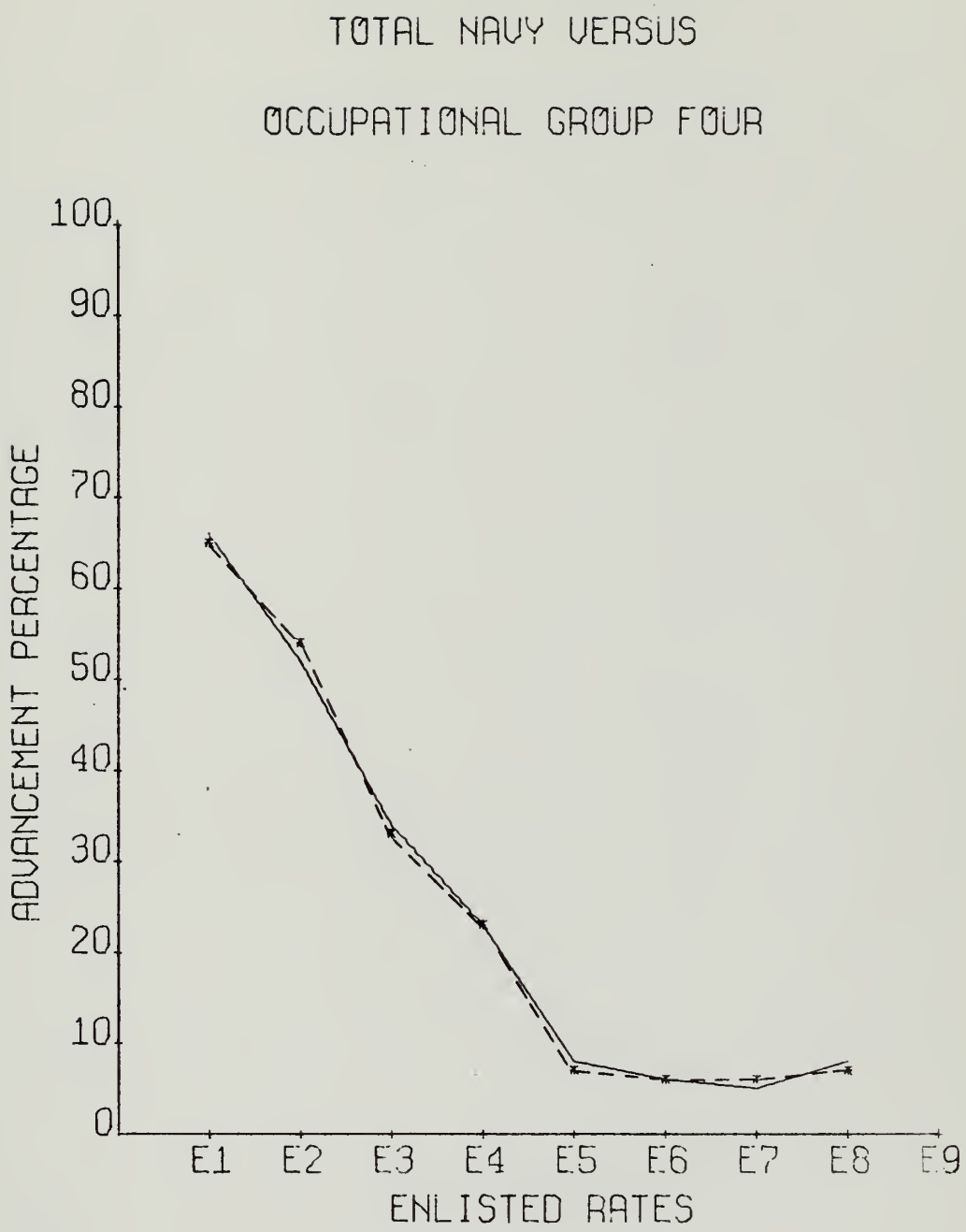
TOTAL NAVY VERSUS
OCCUPATIONAL GROUP FOUR
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 23

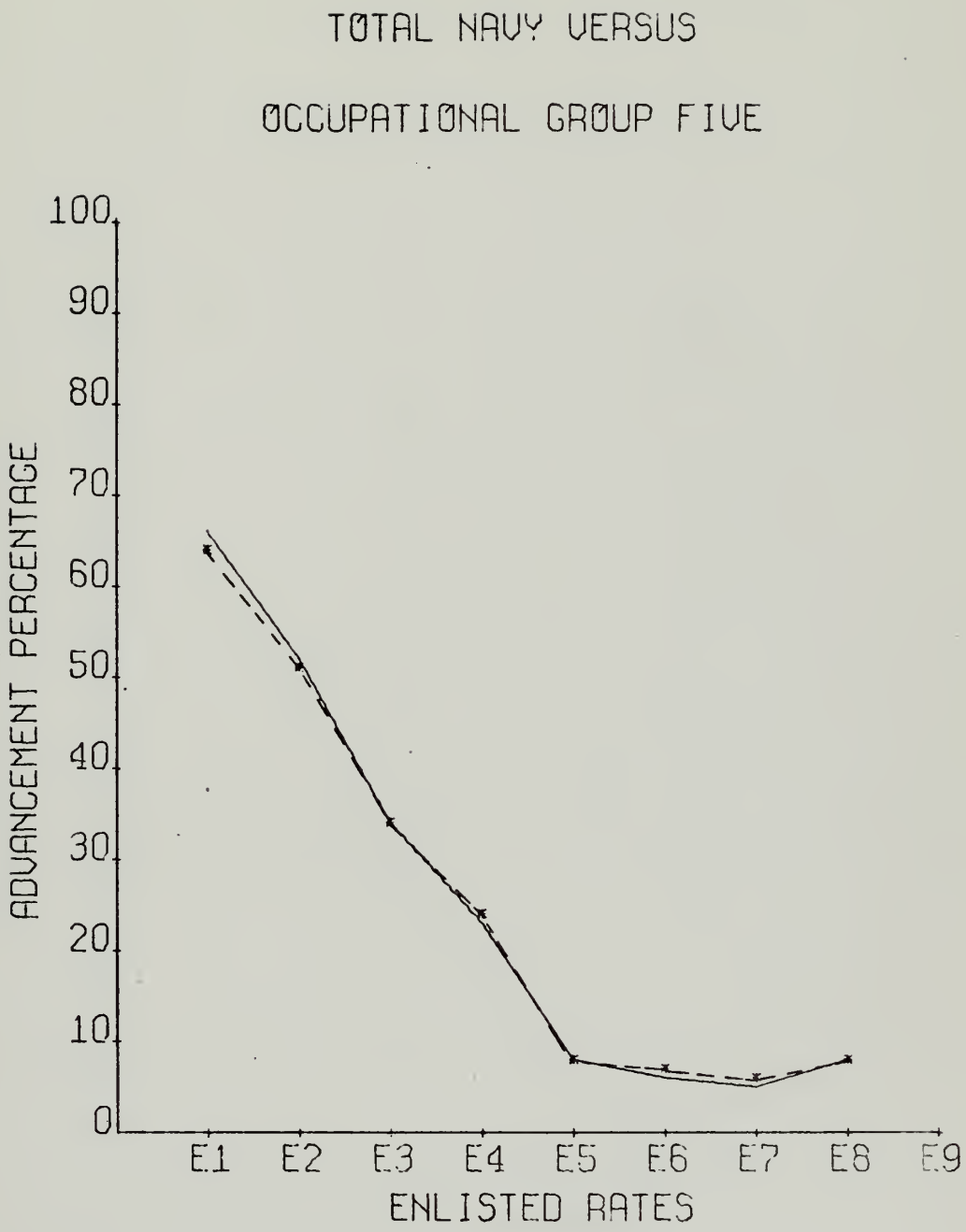
TOTAL NAVY VERSUS
OCCUPATIONAL GROUP FIVE
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 24

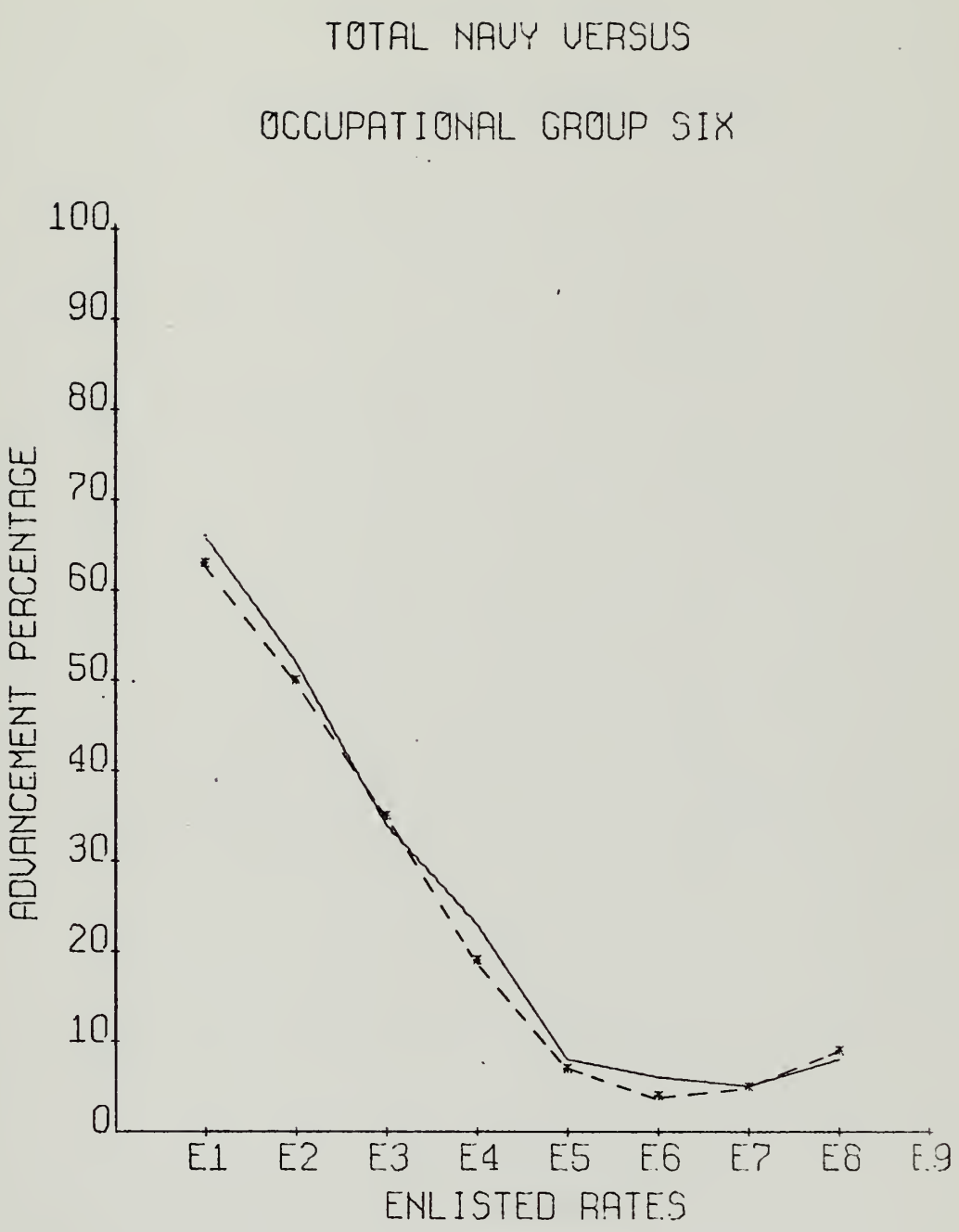
TOTAL NAVY VERSUS
OCCUPATIONAL GROUP SIX
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 25

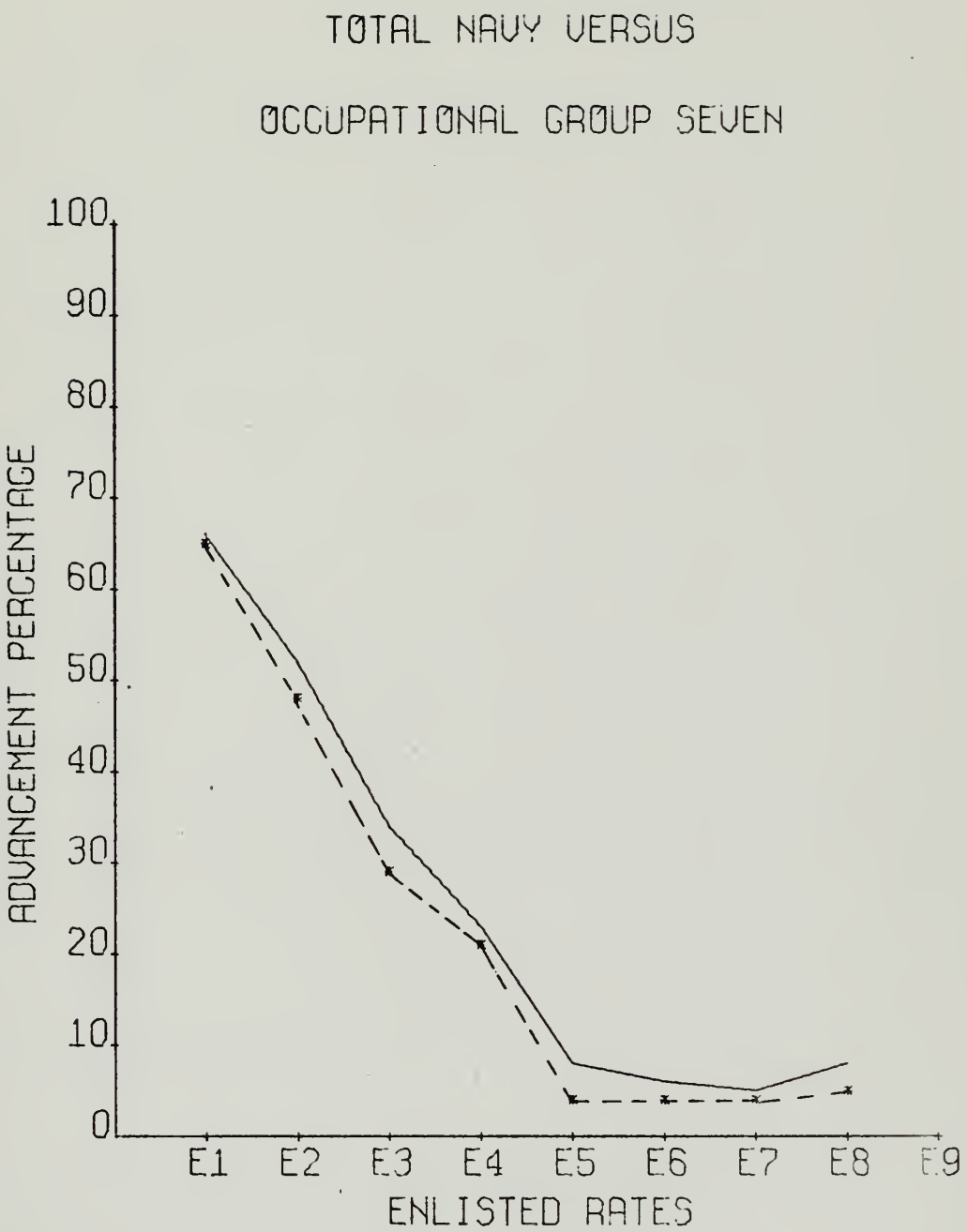
TOTAL NAVY VERSUS
OCCUPATIONAL GROUP SEVEN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 26

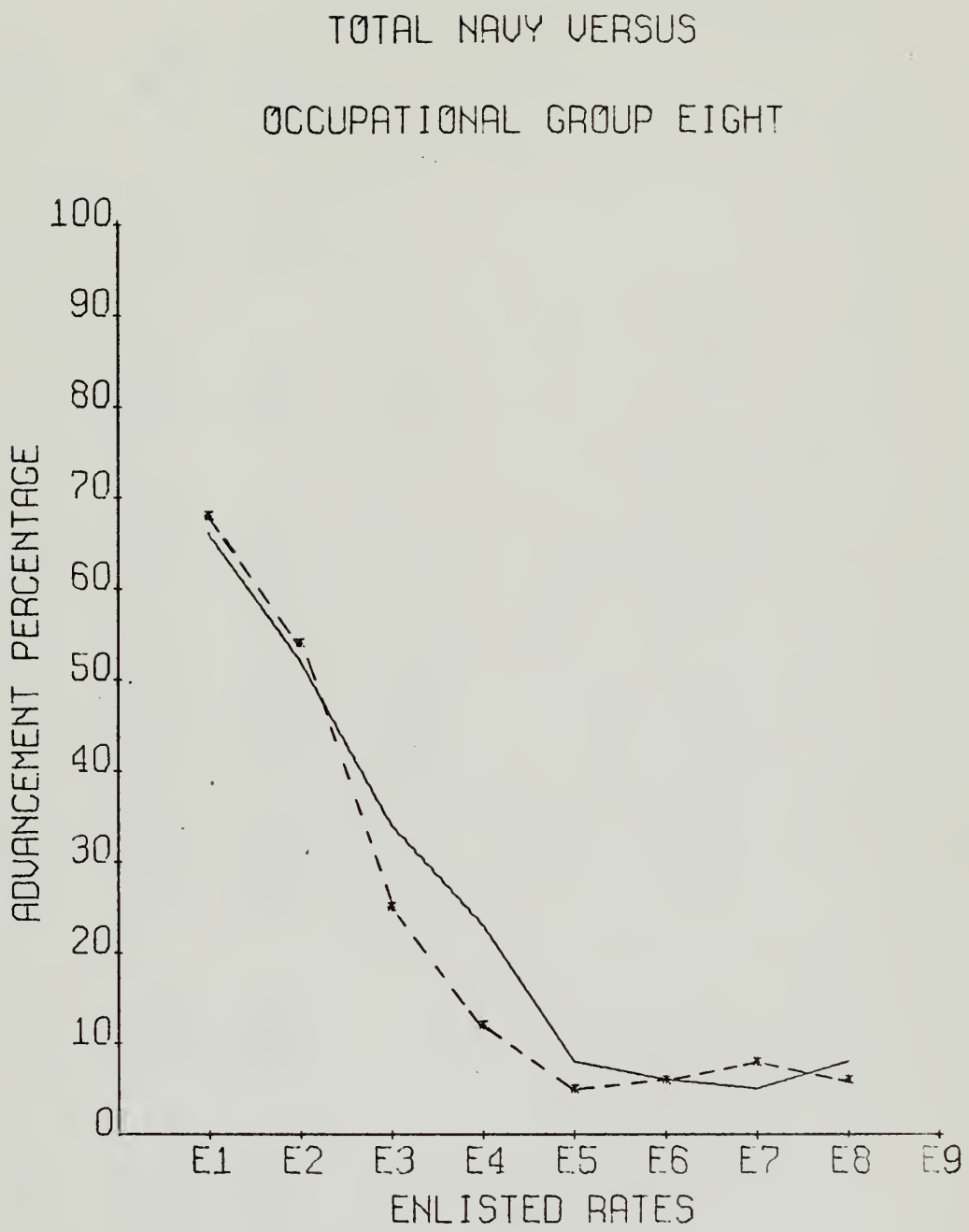
TØTAL NAVY VERSUS
ØCCUPATIØNAL GRØUP EIGHT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 27

ADVANCEMENT PERCENTAGES FOR TOTAL NAVY VERSUS TOTAL SUPPLY
(number of data points in each group)

Rate / Group	E1	E2	E3	E4	E5	E6	E7	E8
Total Navy	66 (20365)	52 (80386)	34 (152292)	23 (146772)	8 (110293)	6 (83515)	5 (41692)	8 (9652)
Total Supply	71 (204)	60 (2141)	29 (12967)	16 (14300)	6 (13648)	5 (11178)	6 (4221)	7 (1012)

Table 6

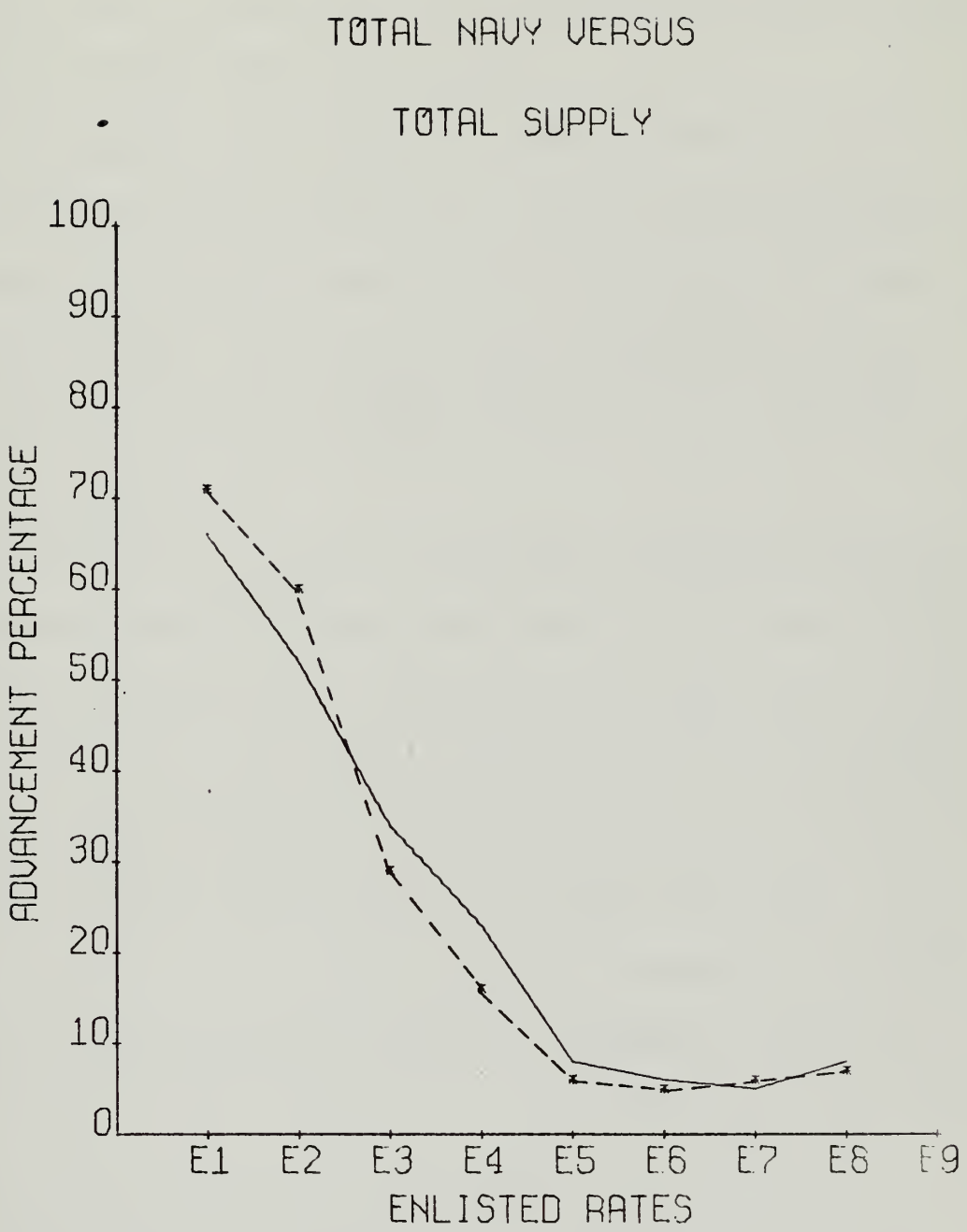
TOTAL NAVY VERSUS
TOTAL SUPPLY
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 28

E. SUPPLY RATINGS

Table 7 lists the advancement percentages for each Supply rating. This data is plotted in Figures 29 thru 36.

For the Supply ratings considered no general behavior as to patterns of advancement was observed. The only thing that could be said in general was that no supply rating paralleled the total Supply figures for all rates. This was not surprising due to the diversity of the type of jobs done by the Supply Department, e.g., technical jobs versus menial jobs.

For the storekeeper, aviation storekeeper, disbursing clerk and data systems technician ratings, no personnel in rate E1 was carried over from the previous year. Two of the factors which could account for this are: (a) persons who enter these rates are of such mentality as to have little or no trouble in advancing to E2, or (b) no one is designated in these rates until they have reached E2 or above.

Since Aviation storekeeping and general storekeeping are similar in nature of duties, these two ratings were compared in Figure 37. It was observed that with the exception of rate E5 the general storekeeper appeared to have an equal or better opportunity for advancement.

For the extremely technical ratings - Data Systems technician and Data Processing technician, Figures 32 and 33 - considered, it was not surprising that the percentages for these ratings were higher than the total Supply figures since, in general, a higher mental group

ADVANCEMENT PERCENTAGES FOR TOTAL SUPPLY VERSUS SUPPLY RATING
(number of data points in each group)

Rate / Rating	E1	E2	E3	E4	E5	E6	E7	E8
AK	0	78	45	21	9	4	3	5
	(4)	(64)	(589)	(1045)	(913)	(803)	(394)	(58)
SK	0	75	52	20	4	4	6	8
	(4)	(312)	(1600)	(3787)	(3194)	(2752)	(1489)	(369)
DK	0	58	51	22	3	5	7	7
	(1)	(26)	(394)	(697)	(749)	(655)	(247)	(59)
DS	0	33	79	32	22	6	9	14
	(0)	(3)	(33)	(510)	(694)	(416)	(45)	(28)
DP	100	82	57	16	10	12	7	7
	(1)	(87)	(746)	(920)	(837)	(694)	(282)	(57)
SH	0	49	40	12	4	9	12	6
	(4)	(47)	(278)	(1653)	(1391)	(1345)	(399)	(104)
CS	6	62	46	14	4	4	7	6
	(17)	(432)	(782)	(3207)	(3300)	(2591)	(931)	(218)
SD	83	52	18	8	6	6	5	8
	(173)	(1170)	(8545)	(2481)	(2570)	(1922)	(434)	(119)

Table 7

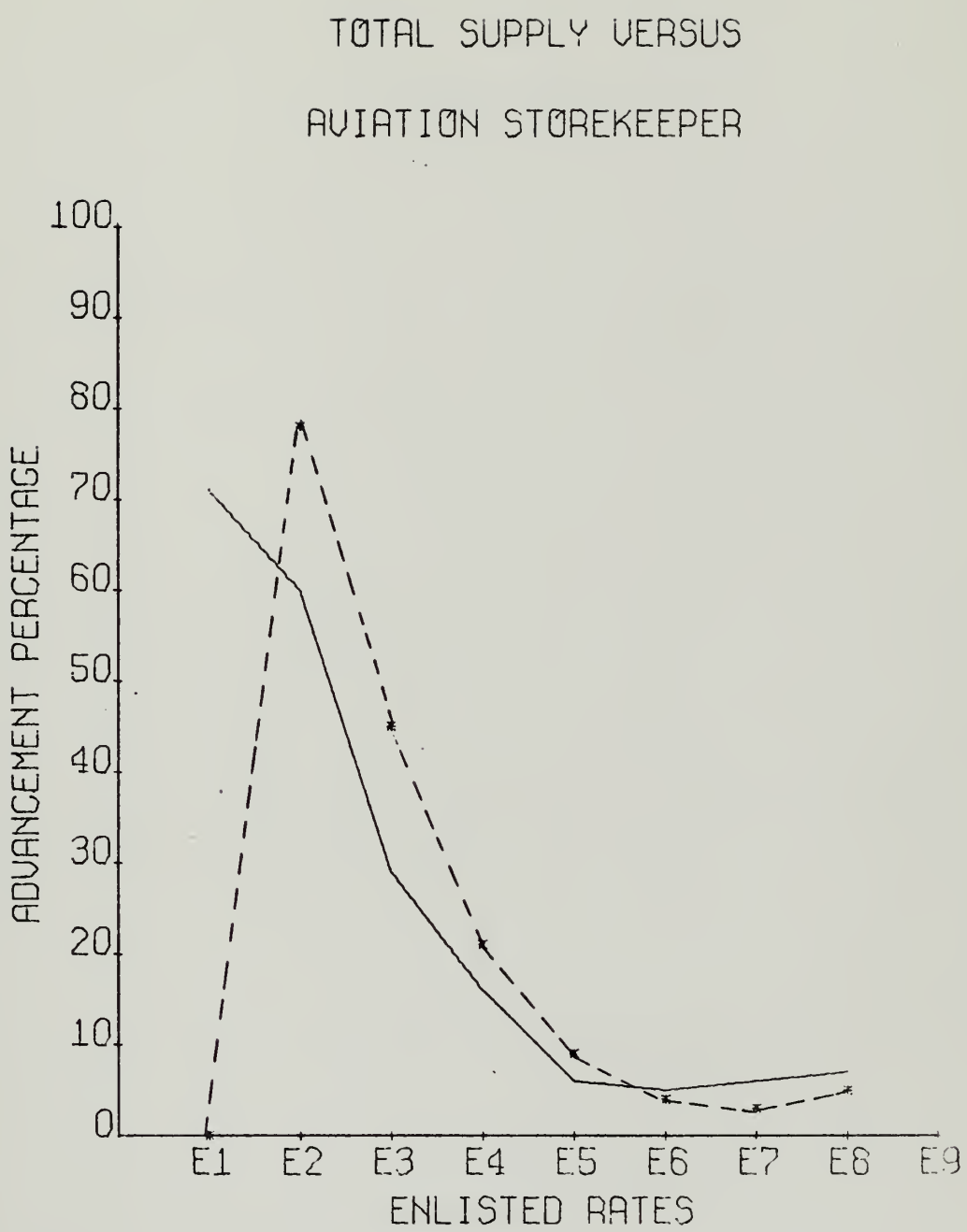
TOTAL SUPPLY VERSUS
AVIATION STOREKEEPER
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 29

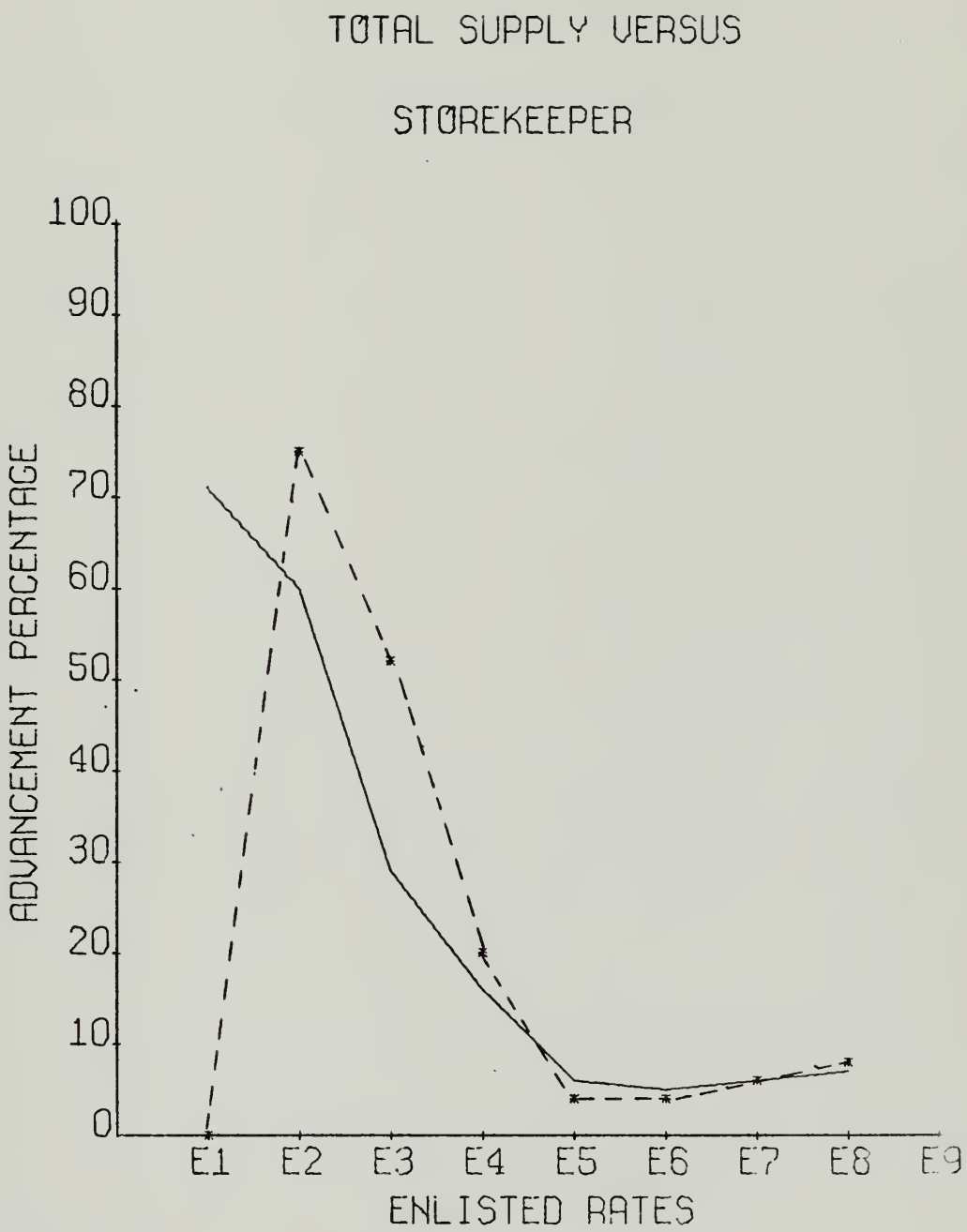
TOTAL SUPPLY VERSUS
STOREKEEPER
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 30

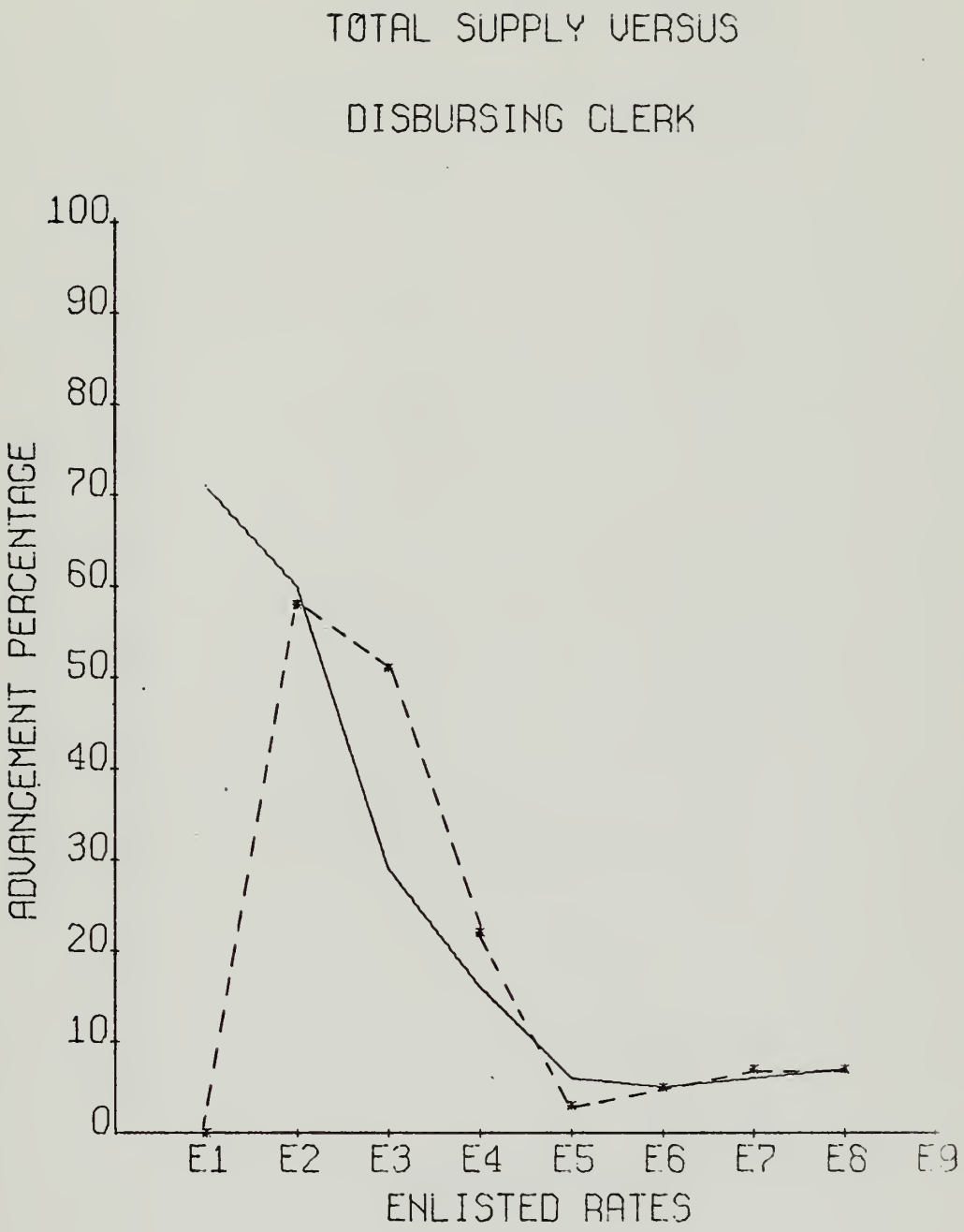
TOTAL SUPPLY VERSUS
DISBURSING CLERK
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 31

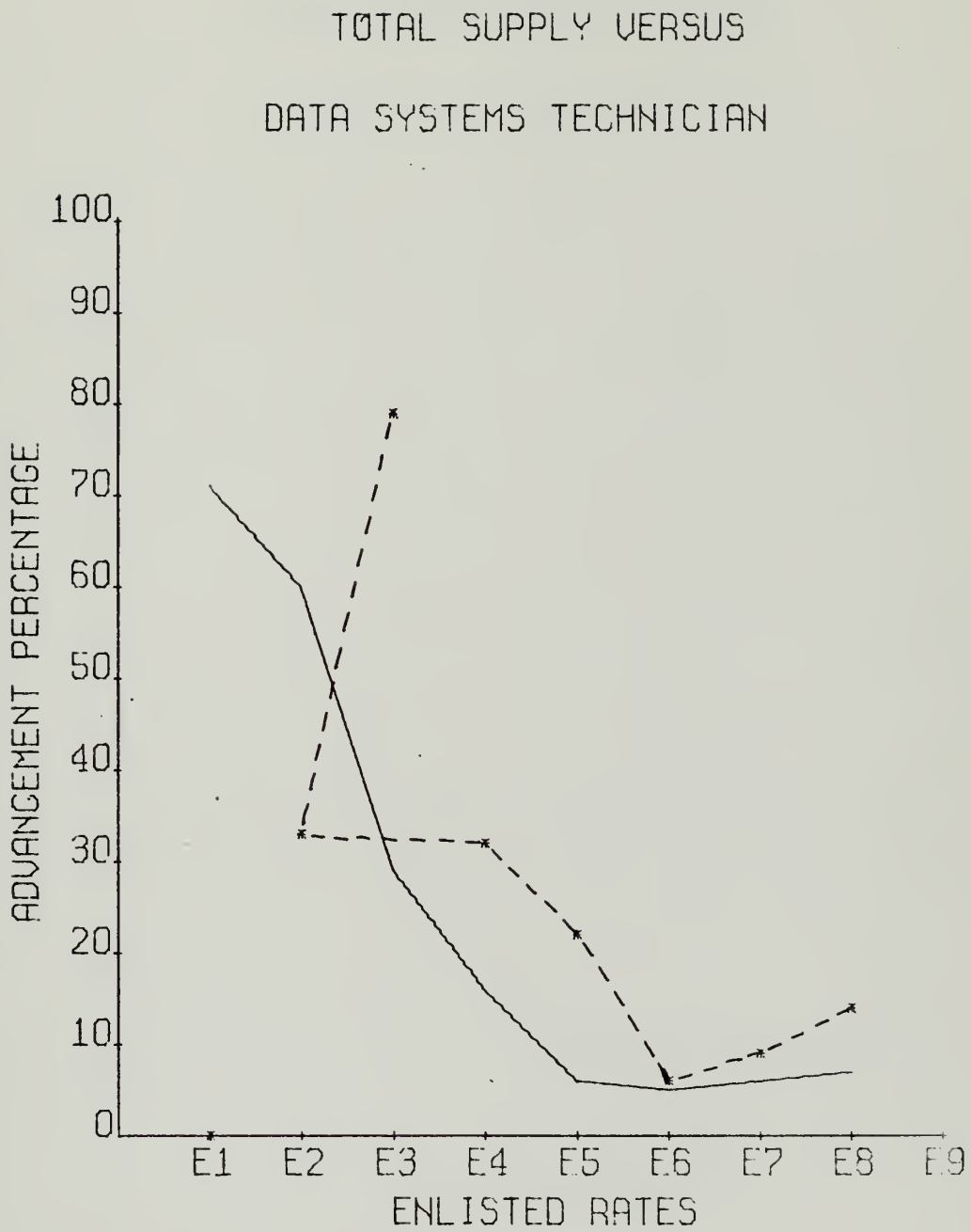
TOTAL SUPPLY VERSUS
DATA SYSTEMS TECHNICIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 32

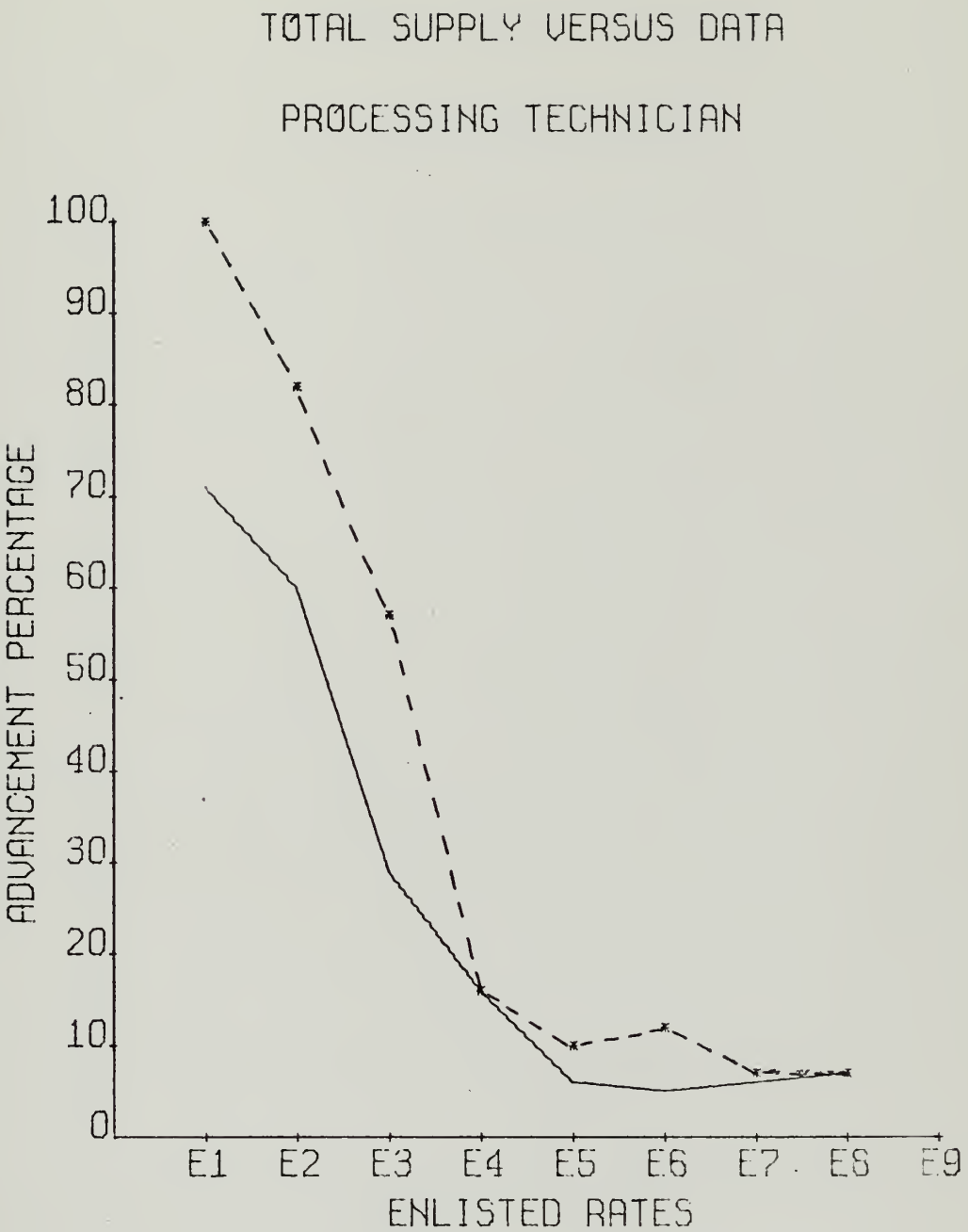
TØTAL SUPPLY VERSUS DATA
PRØCESSING TECHNICIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 33

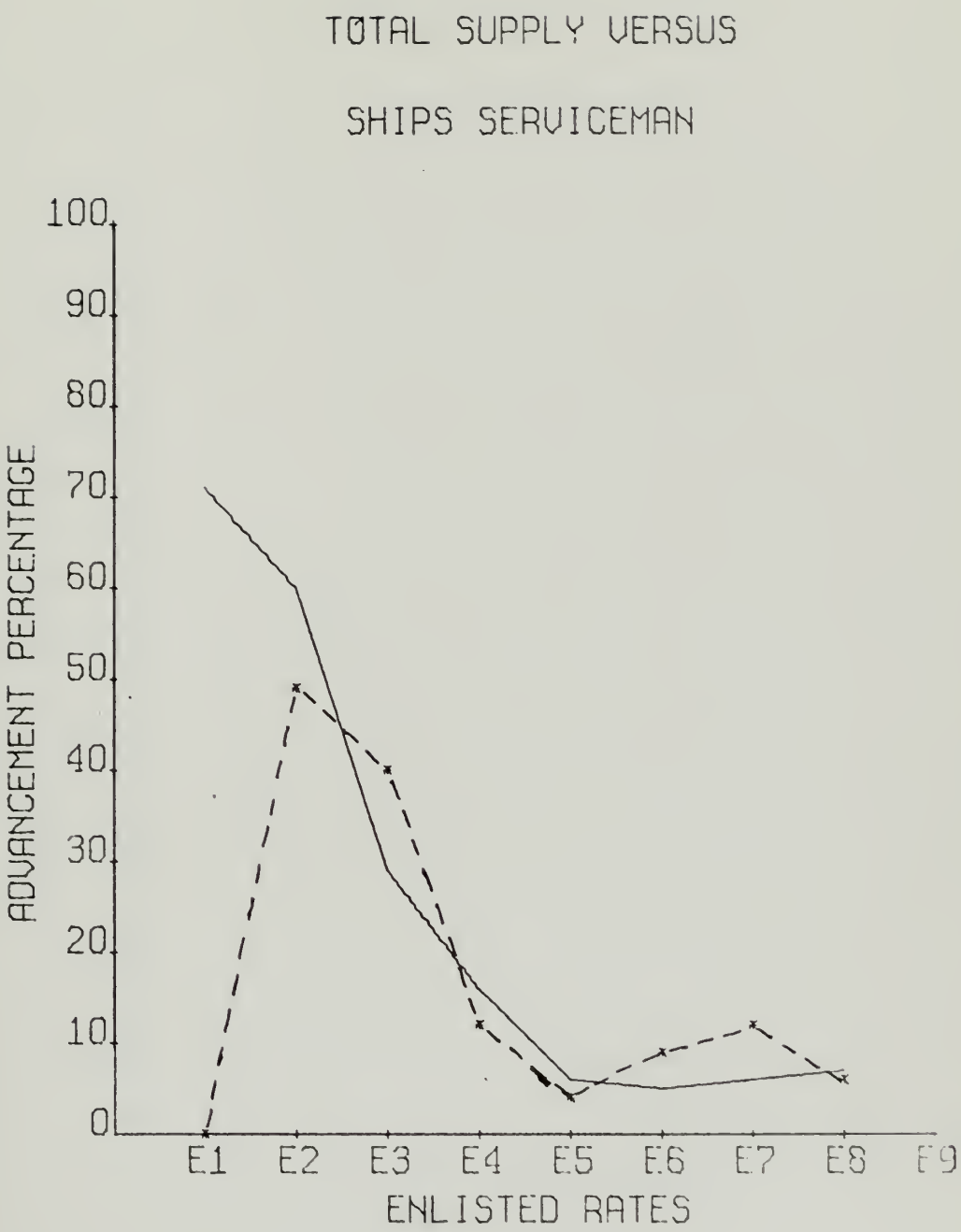
TOTAL SUPPLY VERSUS
SHIPS SERVICEMAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 34

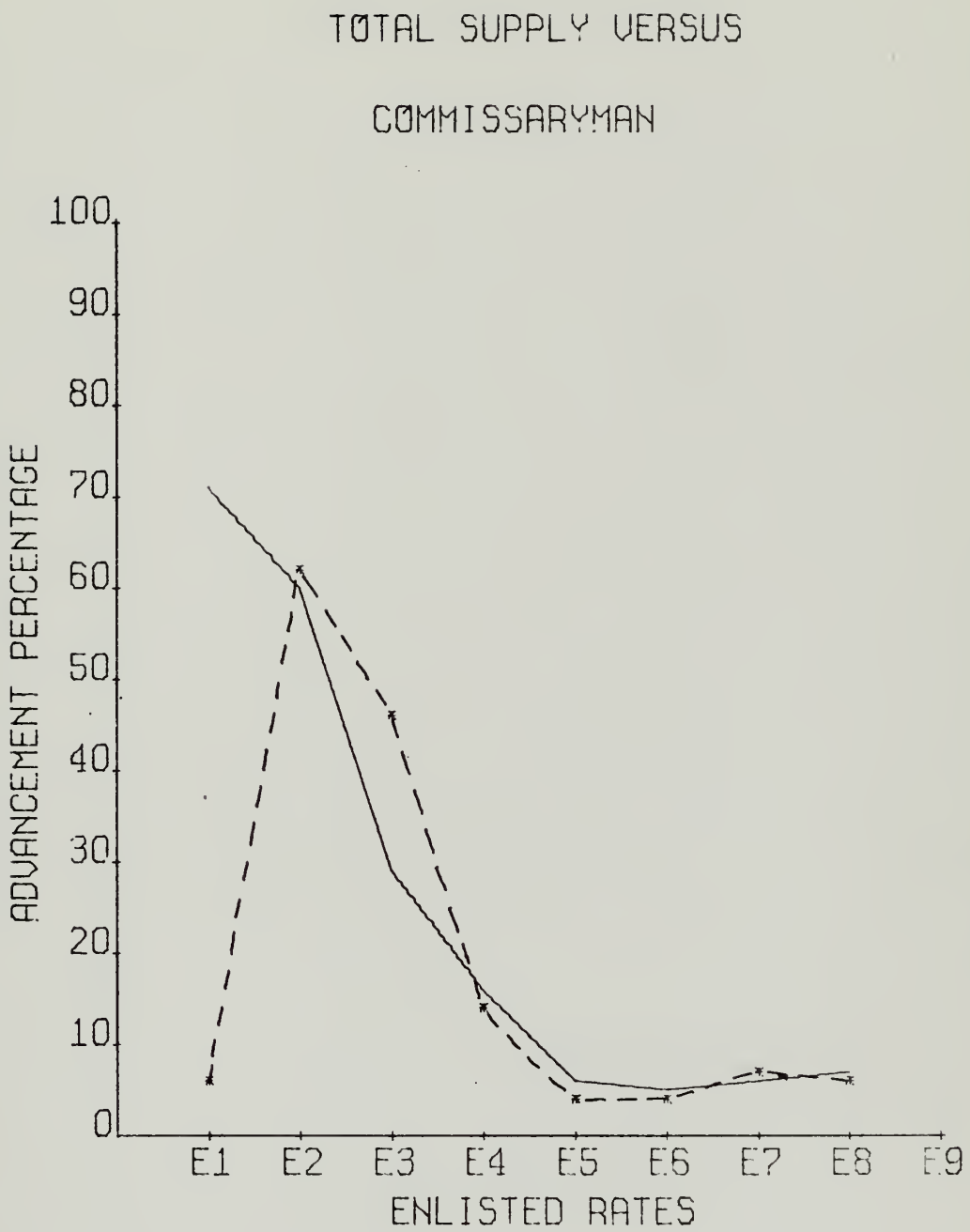
TOTAL SUPPLY VERSUS
COMMISSARYMAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 35

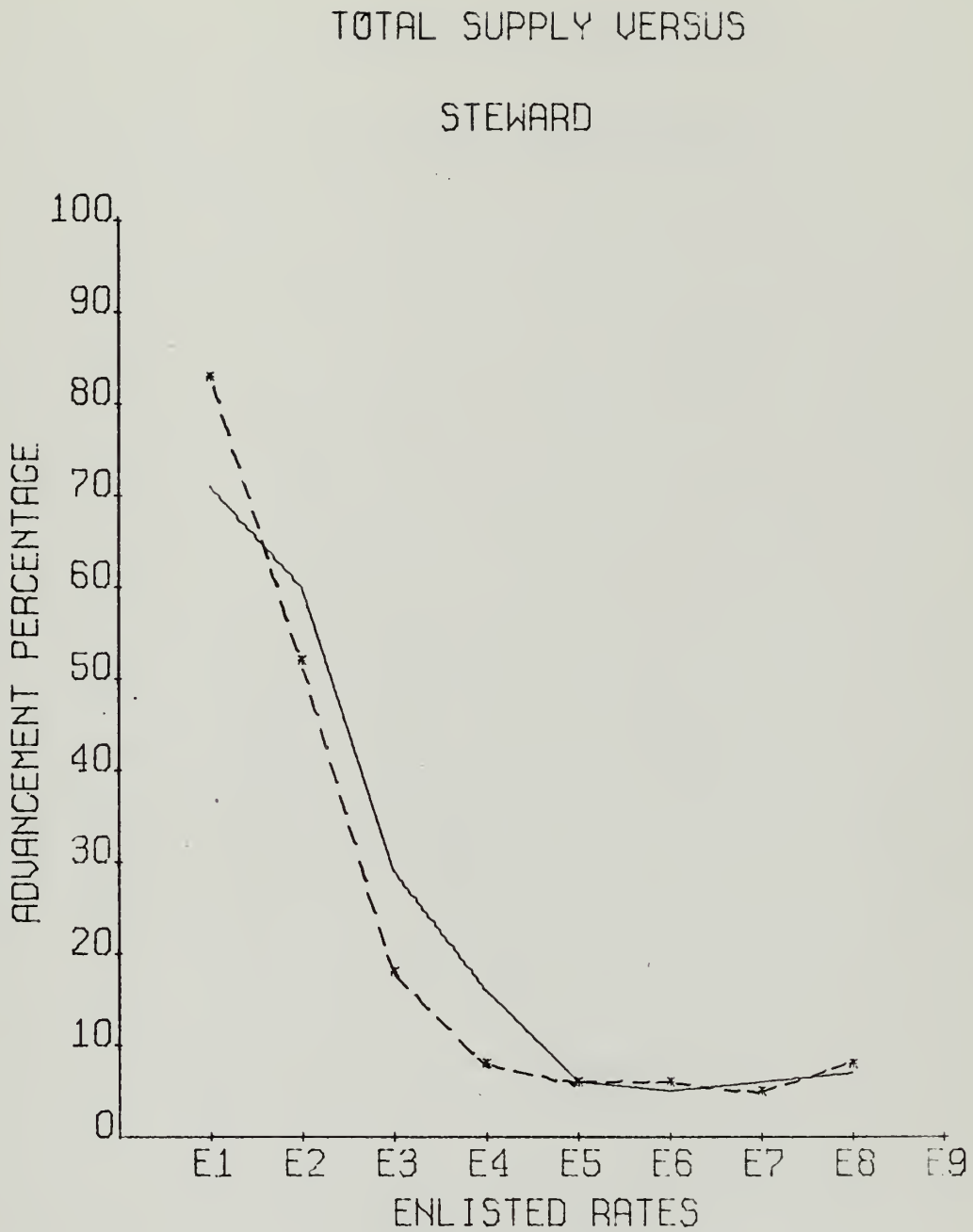
TOTAL SUPPLY VERSUS
STEWARD
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 36

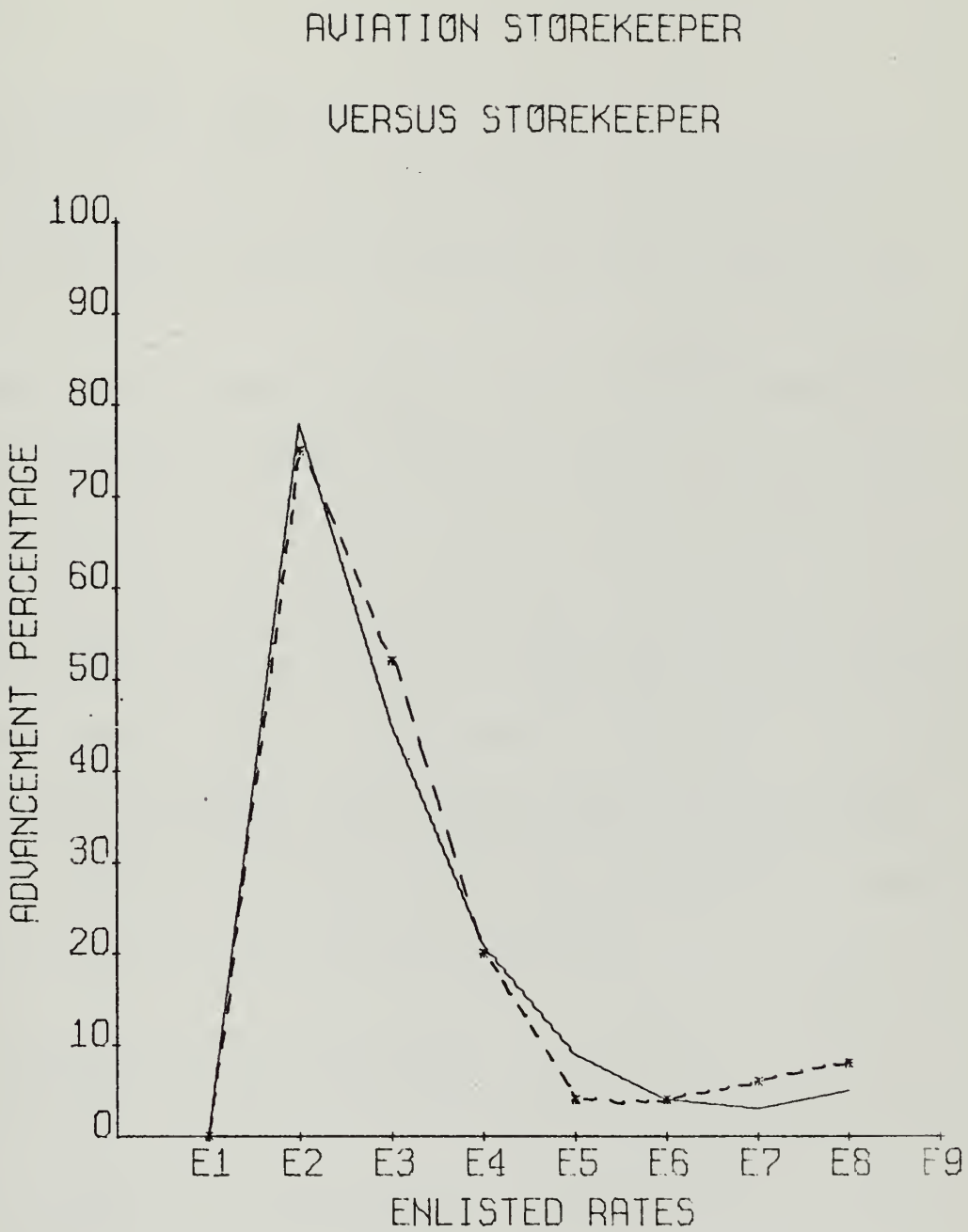
AVIATION STOREKEEPER
VERSUS STOREKEEPER
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 37

are assigned these ratings than are assigned to the other Supply ratings.

SUPPLY RATINGS: RACE

Table 8 lists the advancement percentage for personnel in the Supply ratings by each race. This data is plotted in Figures 38 thru 42.

It was observed that percentages for Caucasian personnel paralleled total Supply percentages except for rates E1 and E3. It was observed that Negroid personnel in general had an opportunity for advancement no greater than (often less than) other Supply personnel, while Mongolian personnel had a greater opportunity, except in rate E5, than other Supply personnel. In the rates E4, E5, and E7, American Indian personnel appeared to have a better opportunity for advancement than other races. For exact comparison adjustment for number of personnel in each race would have to be made.

G. SUPPLY RATINGS: EDUCATION

Table 9 lists the advancement percentages for years of education from 6 to 18 years for Supply ratings. This data is plotted in Figures 43 thru 55.

It was observed, as was seen for total Navy figures, that there was a significant increase in the advancement percentages in rates E1 thru E4 for personnel with 12 or more years of education. For

ADVANCEMENT PERCENTAGES FOR TOTAL SUPPLY VERSUS RACE
(number of data points in each group)

Rate / Race	E1	E2	E3	E4	E5	E6	E7	E8
0	18 (40)	58 (1451)	45 (4817)	17 (10624)	6 (9505)	5 (6860)	7 (2863)	7 (803)
1	0 (6)	29 (58)	27 (311)	13 (931)	7 (1337)	6 (1486)	5 (490)	3 (104)
2	0 (0)	38 (8)	0 (9)	33 (6)	10 (21)	0 (16)	25 (4)	0 (0)
3	88 (158)	68 (618)	20 (7816)	11 (2713)	7 (2756)	7 (2794)	4 (858)	10 (104)
4	0 (0)	83 (6)	50 (14)	35 (26)	4 (29)	9 (22)	0 (6)	100 (1)

Table 8

Race Code	Race	Percentage of Total
0	Caucasian	64.9
1	Negroid	7.6
2	American Indian	.1
3	Malayan	27.2
4	Mongolian	.2

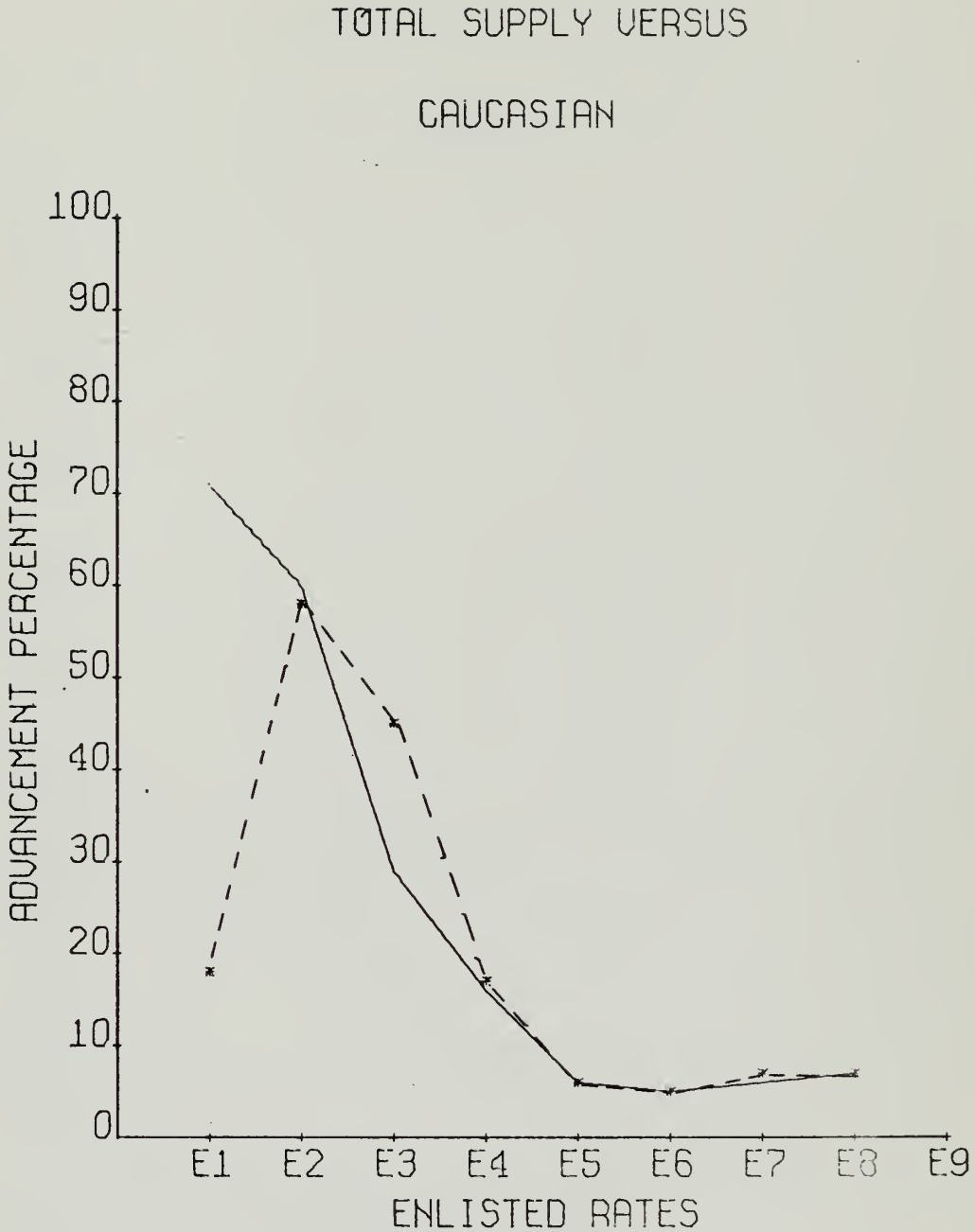
TOTAL SUPPLY VERSUS
CAUCASIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 38

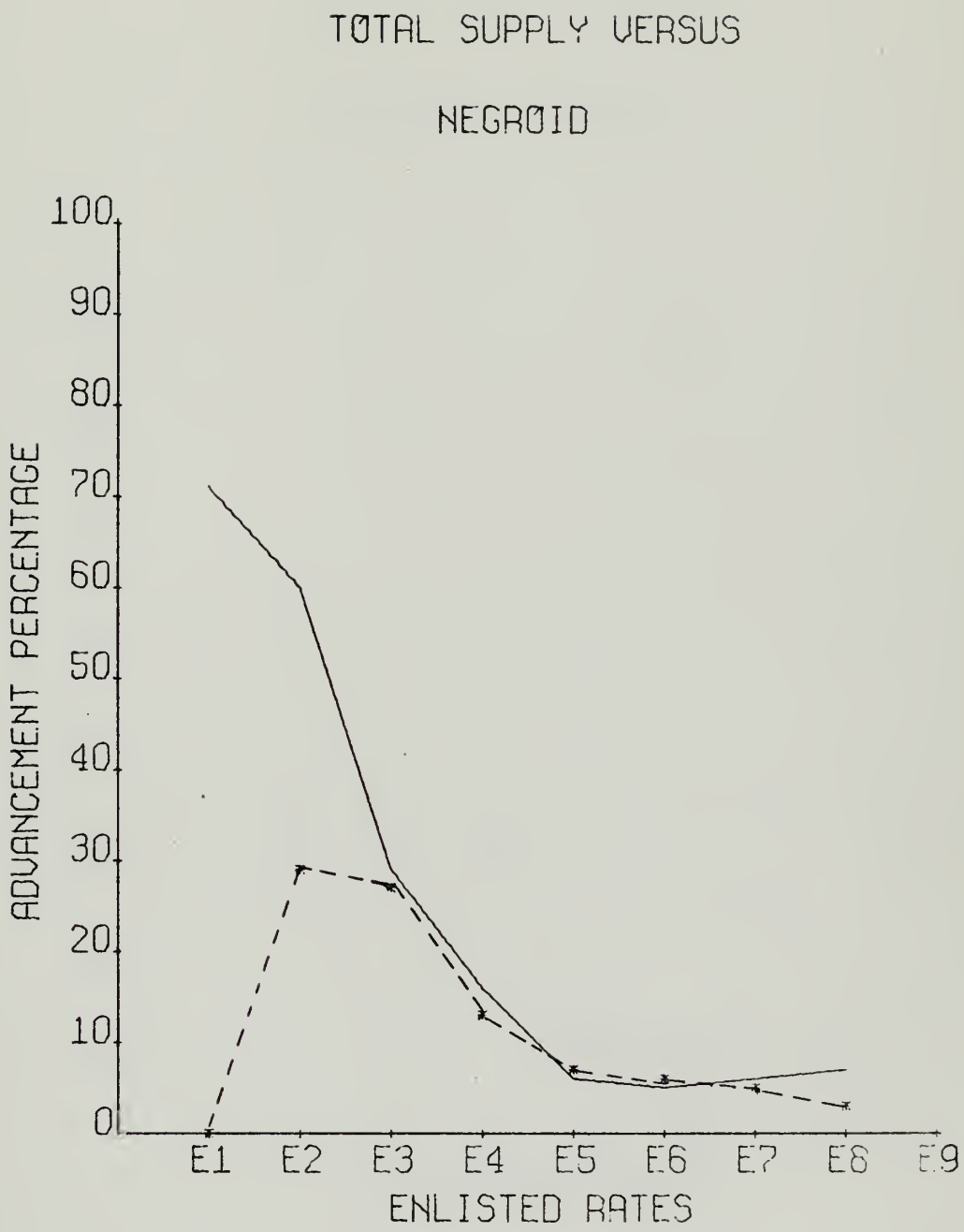
TOTAL SUPPLY VERSUS
NEGROID
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 39

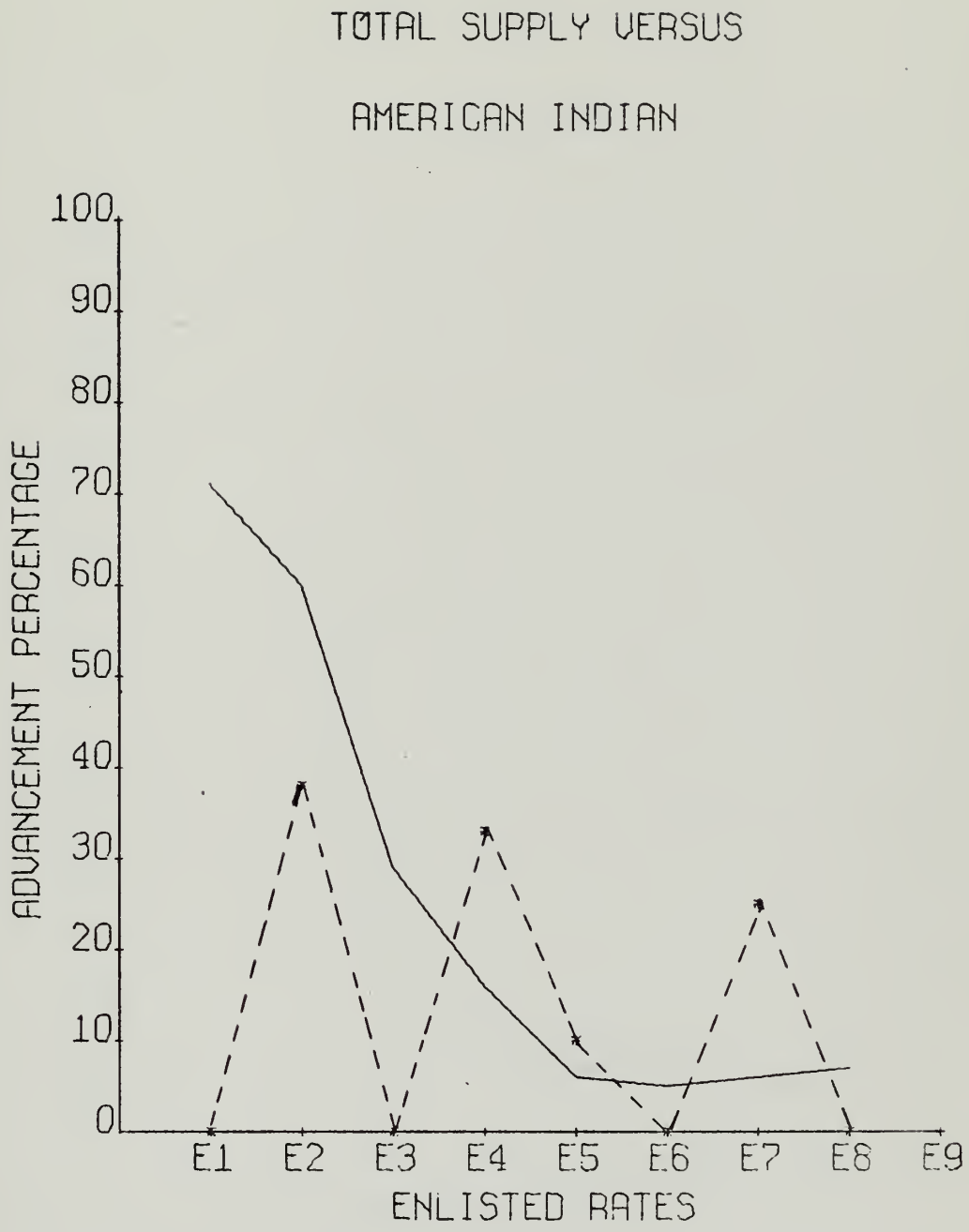
TOTAL SUPPLY VERSUS
AMERICAN INDIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 40

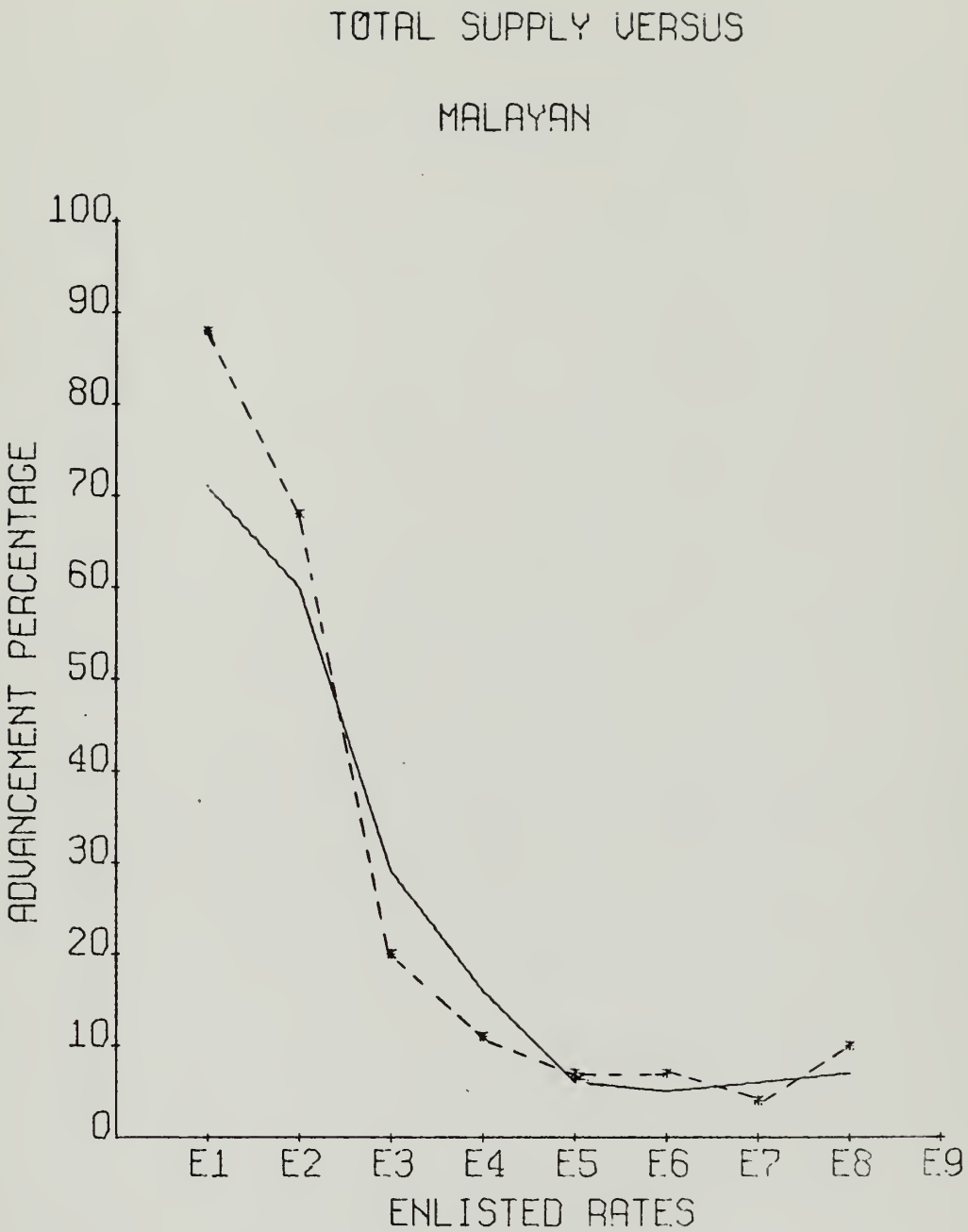
TOTAL SUPPLY VERSUS
MALAYAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 41

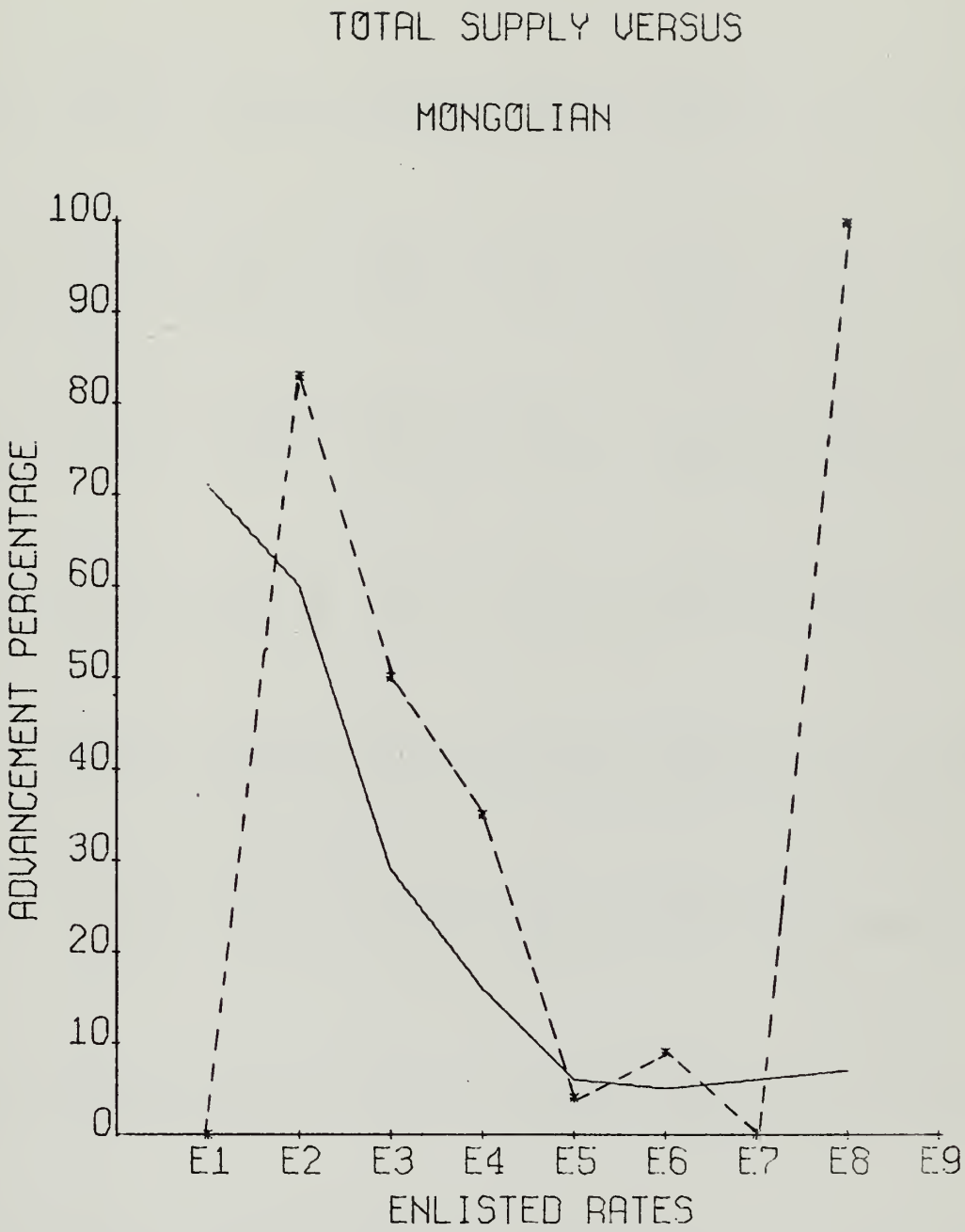
TOTAL SUPPLY VERSUS
MONGOLIAN
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 42

ADVANCEMENT PERCENTAGES FOR TOTAL SUPPLY VERSUS YEARS OF EDUCATION
(number of data points in each group)

Rate / years	E1	E2	E3	E4	E5	E6	E7	E8
6	0 (0)	0 (0)	50 (2)	20 (5)	5 (21)	11 (9)	0 (4)	0 (2)
7	0 (2)	50 (2)	29 (17)	9 (57)	7 (188)	5 (319)	8 (156)	8 (26)
8	0 (0)	22 (23)	12 (50)	16 (163)	6 (541)	6 (711)	5 (299)	2 (60)
9	33 (6)	24 (54)	13 (102)	14 (278)	7 (742)	4 (1053)	6 (417)	9 (87)
10	0 (9)	23 (115)	27 (368)	13 (772)	7 (1593)	6 (2016)	5 (738)	5 (146)
11	0 (9)	42 (114)	30 (253)	13 (669)	9 (1025)	5 (1166)	7 (474)	9 (114)
12	74 (134)	65 (1736)	27 (10875)	14 (8960)	6 (6903)	5 (5009)	7 (1837)	8 (492)
13	96 (26)	62 (58)	42 (595)	19 (1255)	6 (920)	10 (391)	8 (136)	7 (45)
14	100 (12)	60 (20)	47 (384)	22 (955)	5 (938)	3 (291)	5 (109)	3 (34)
15	100 (4)	38 (8)	39 (105)	25 (351)	5 (313)	3 (89)	4 (27)	0 (3)
16	100 (2)	50 (8)	53 (198)	32 (785)	1 (431)	2 (101)	0 (22)	0 (3)
17	0 (0)	0 (0)	70 (10)	32 (34)	0 (17)	0 (10)	0 (1)	0 (0)
18	0 (0)	0 (0)	33 (6)	33 (15)	0 (9)	0 (8)	0 (0)	0 (0)

Table 9

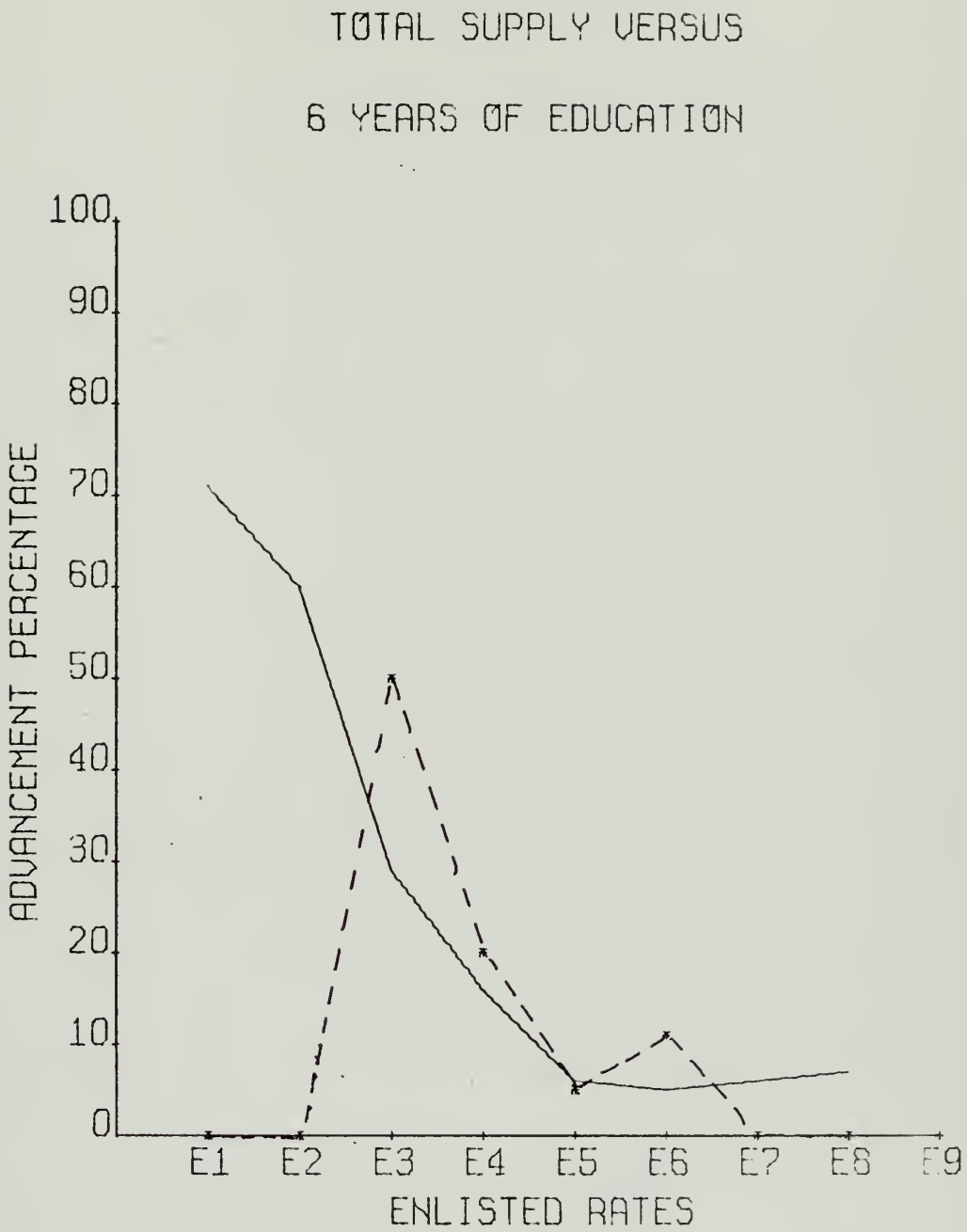
TOTAL SUPPLY VERSUS
6 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 43

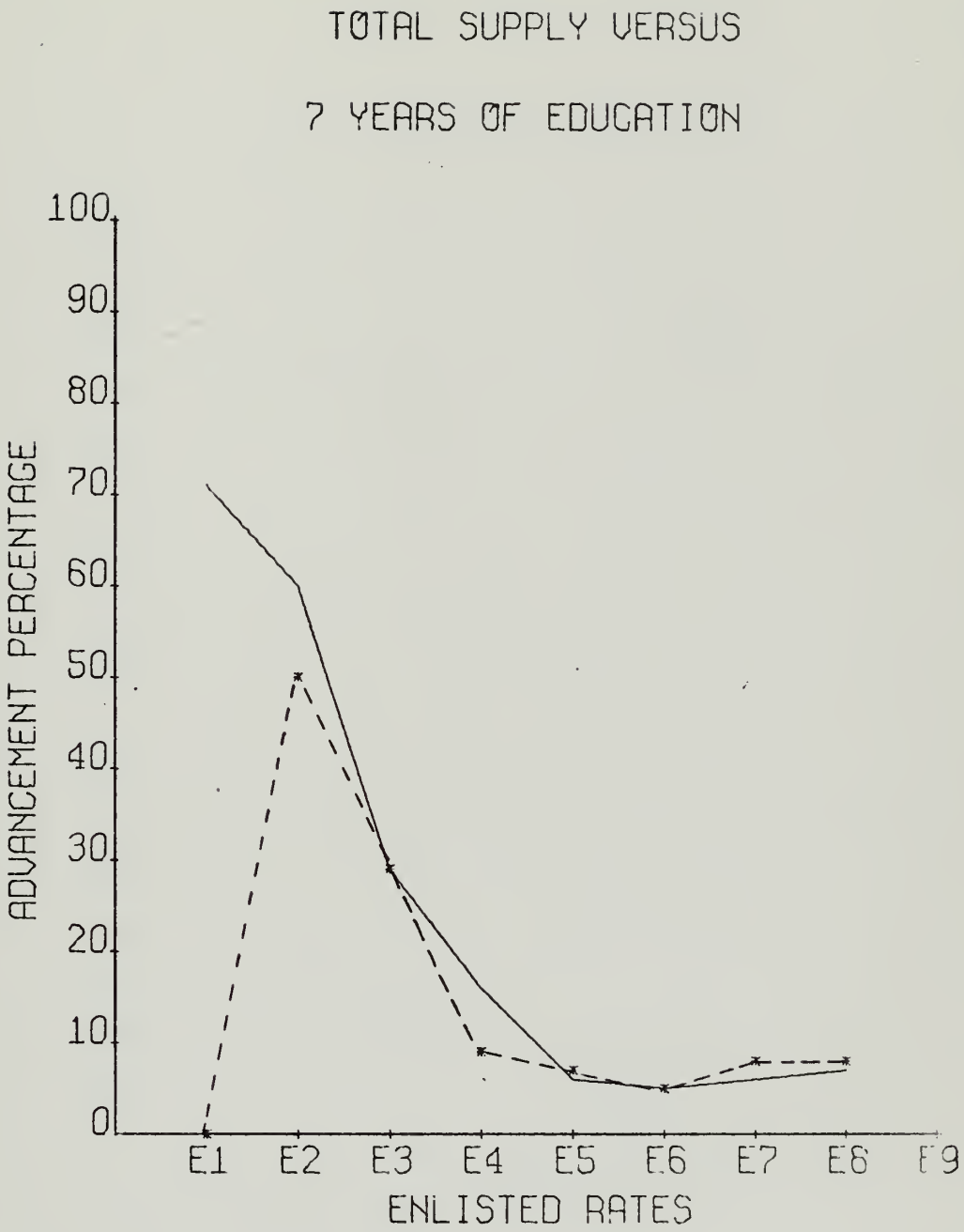
TOTAL SUPPLY VERSUS
7 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 44

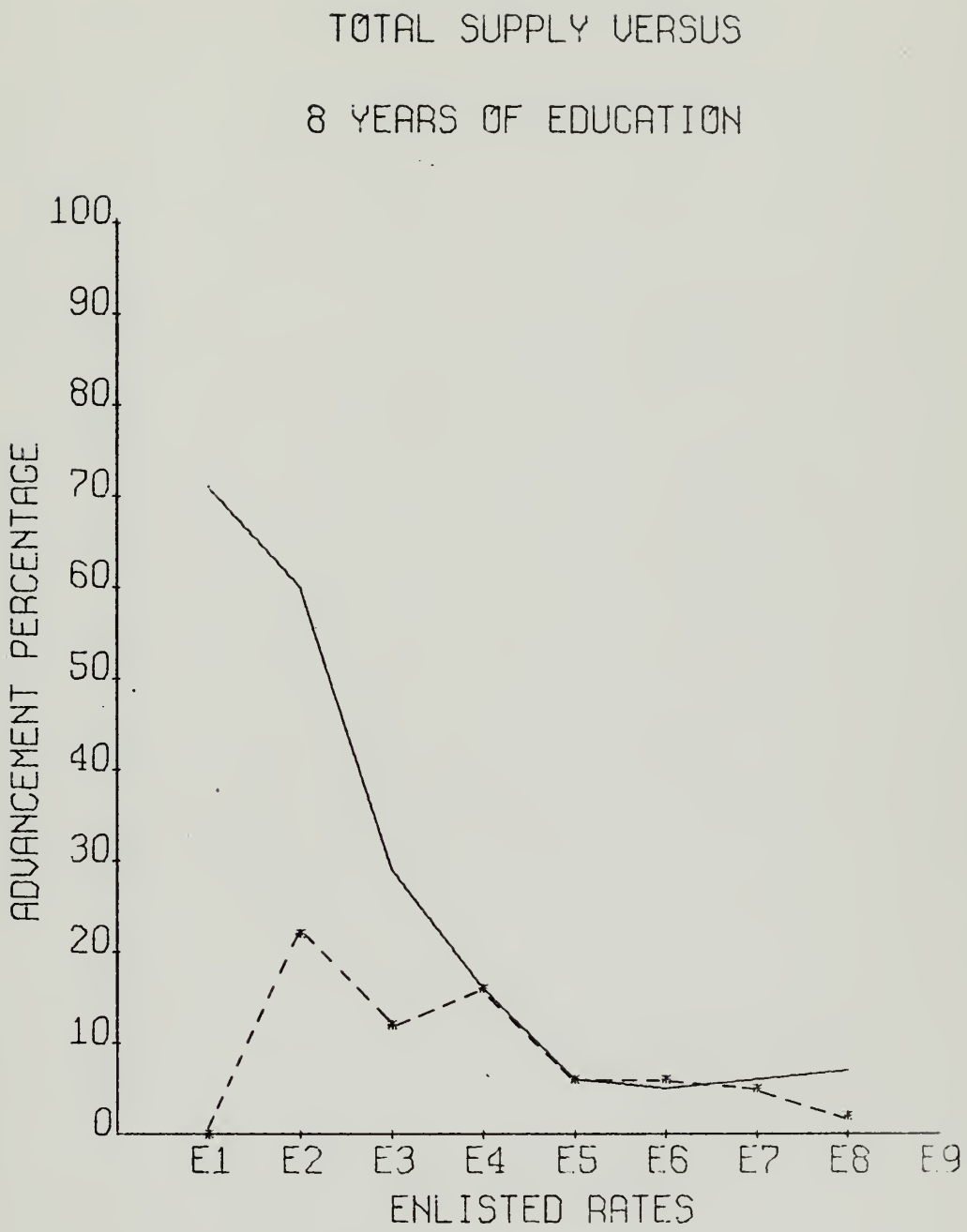
TOTAL SUPPLY VERSUS
8 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 45

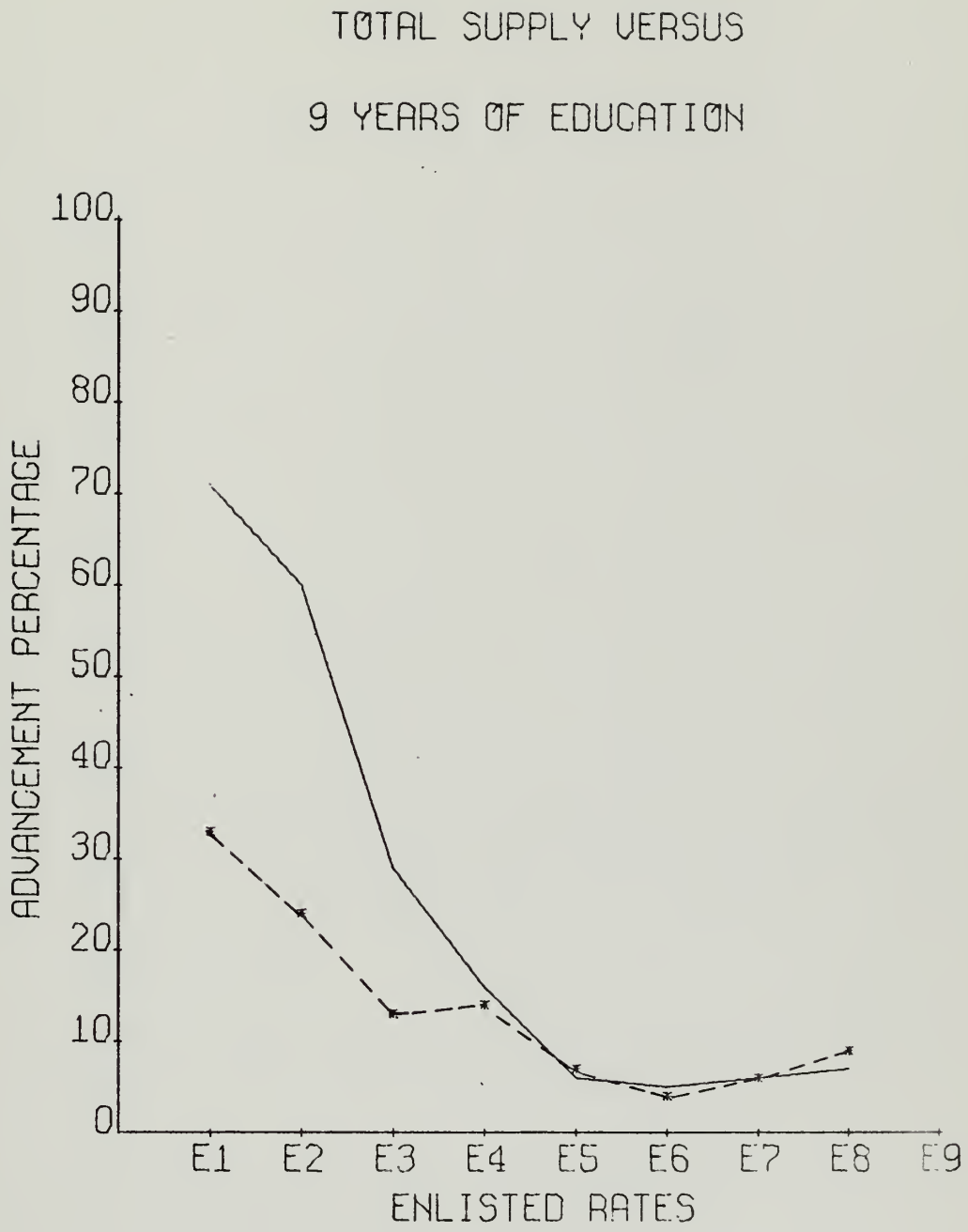
TOTAL SUPPLY VERSUS
9 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 46

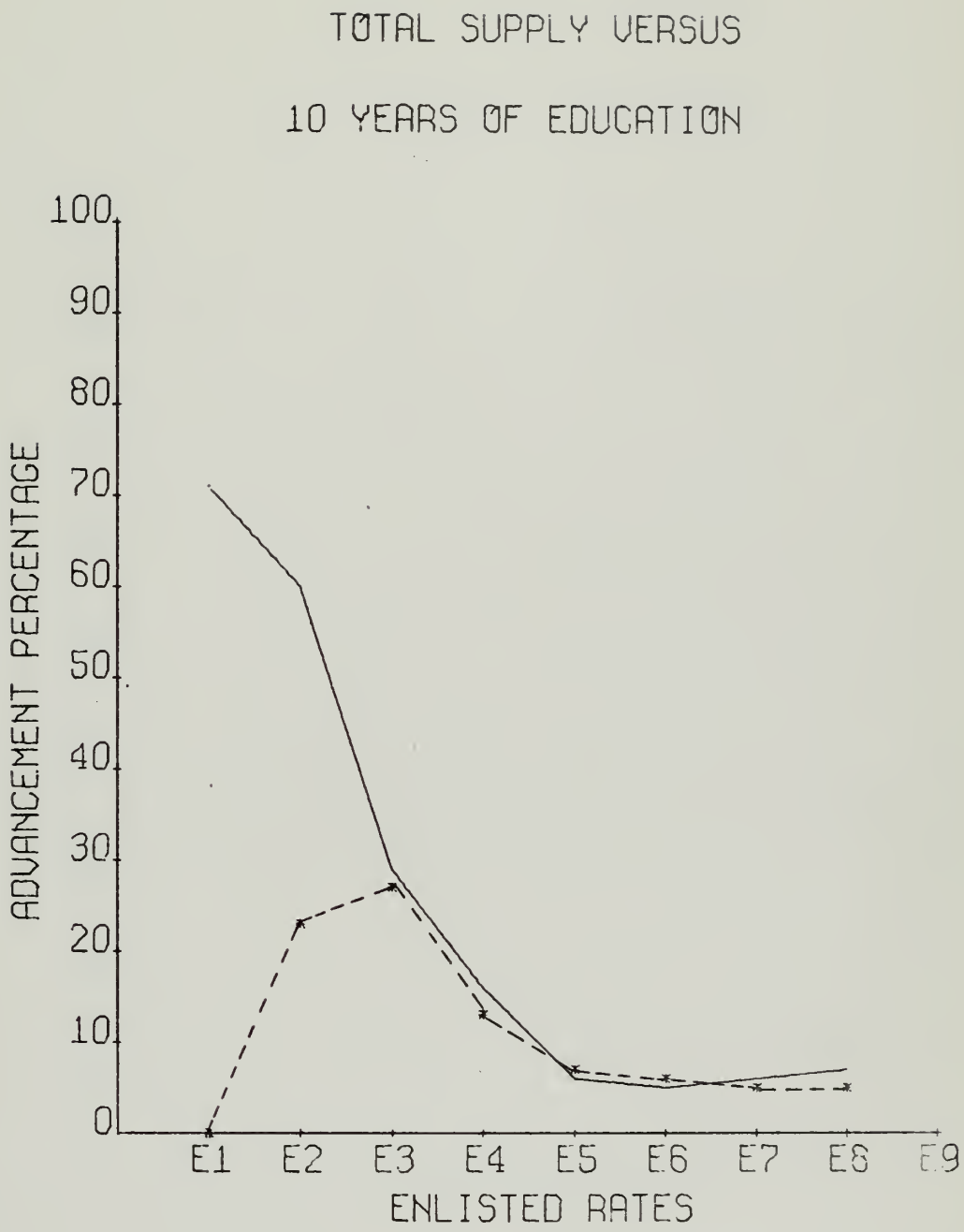
TOTAL SUPPLY VERSUS
10 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 47

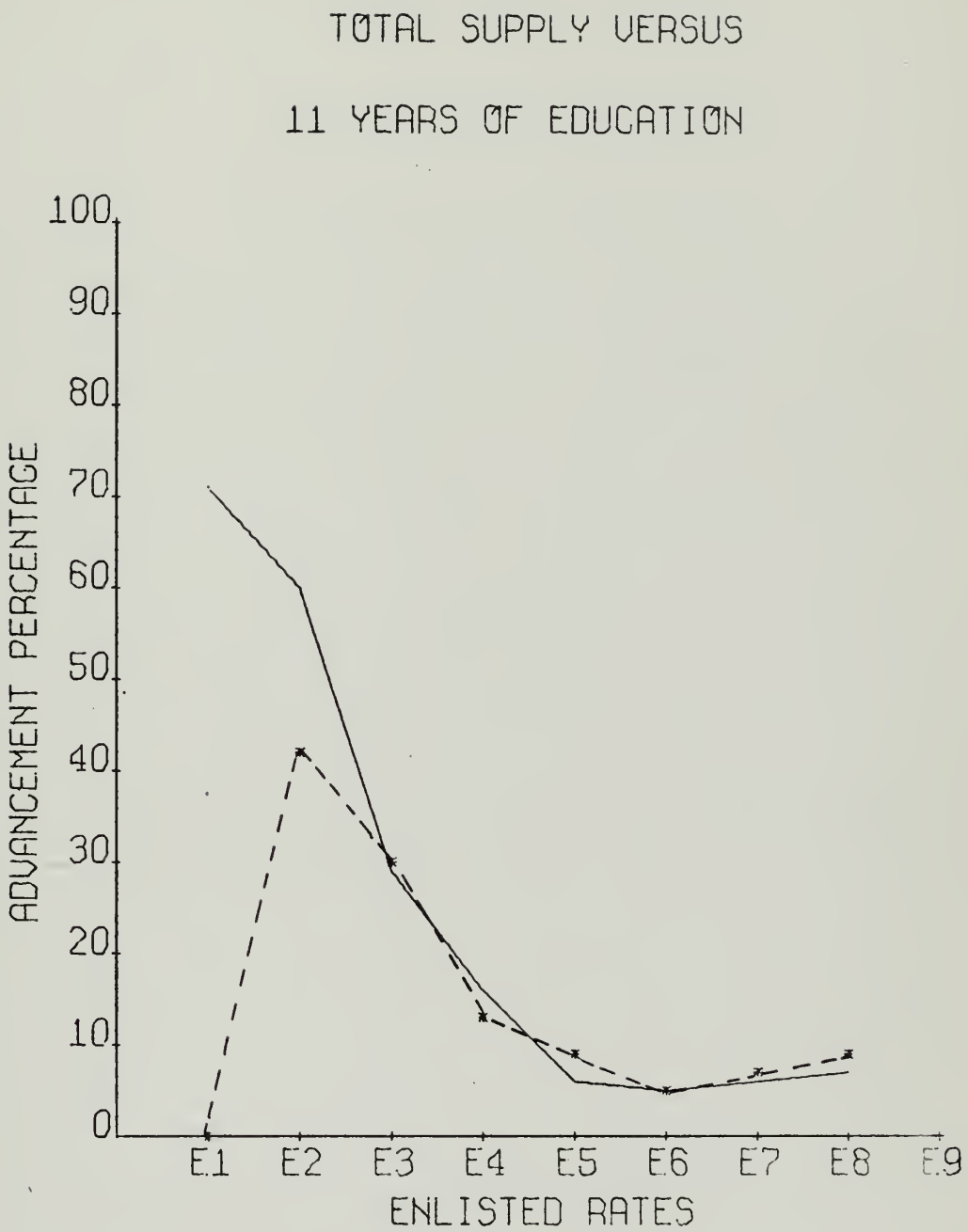
TOTAL SUPPLY VERSUS
11 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 48

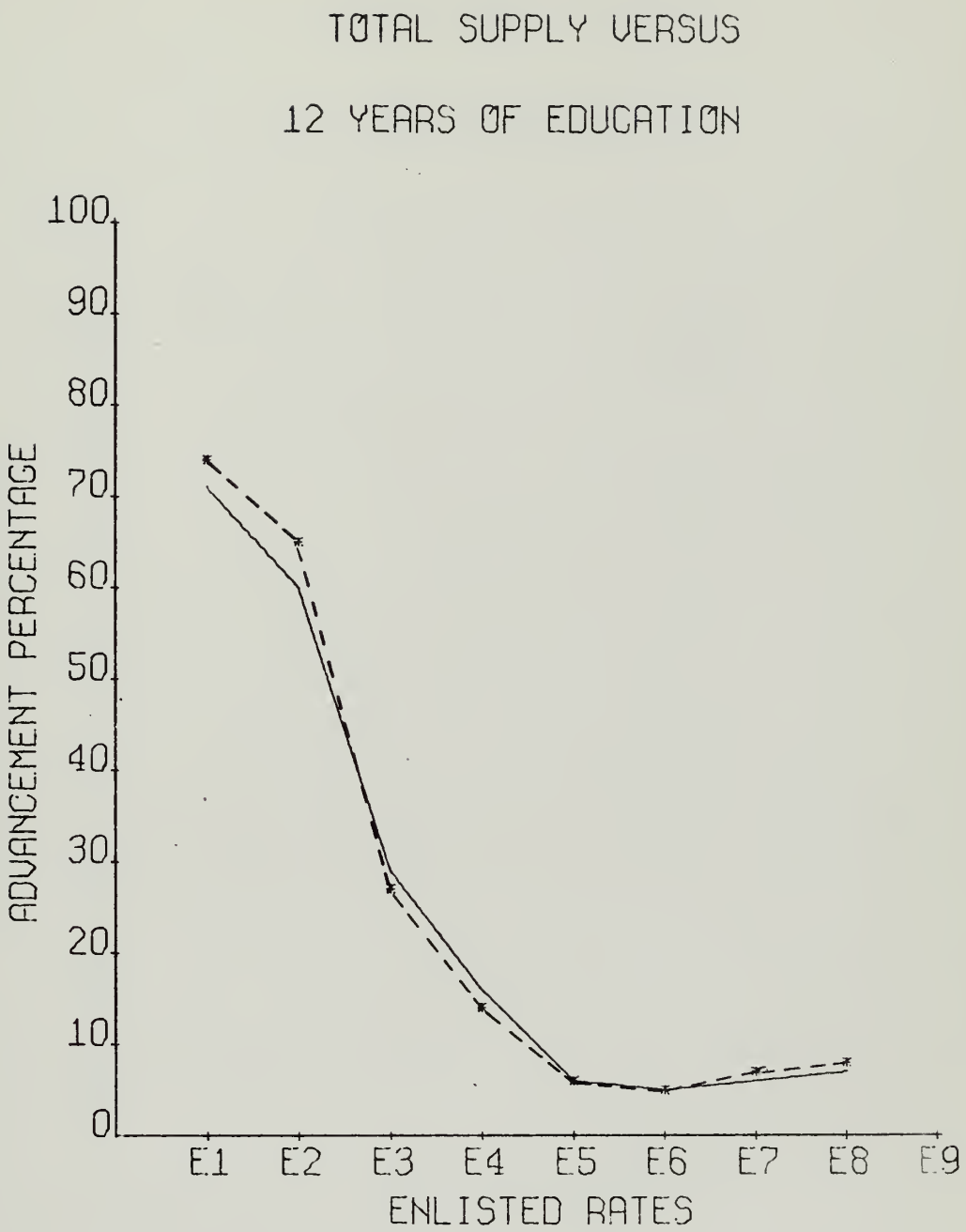
TOTAL SUPPLY VERSUS
12 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 49

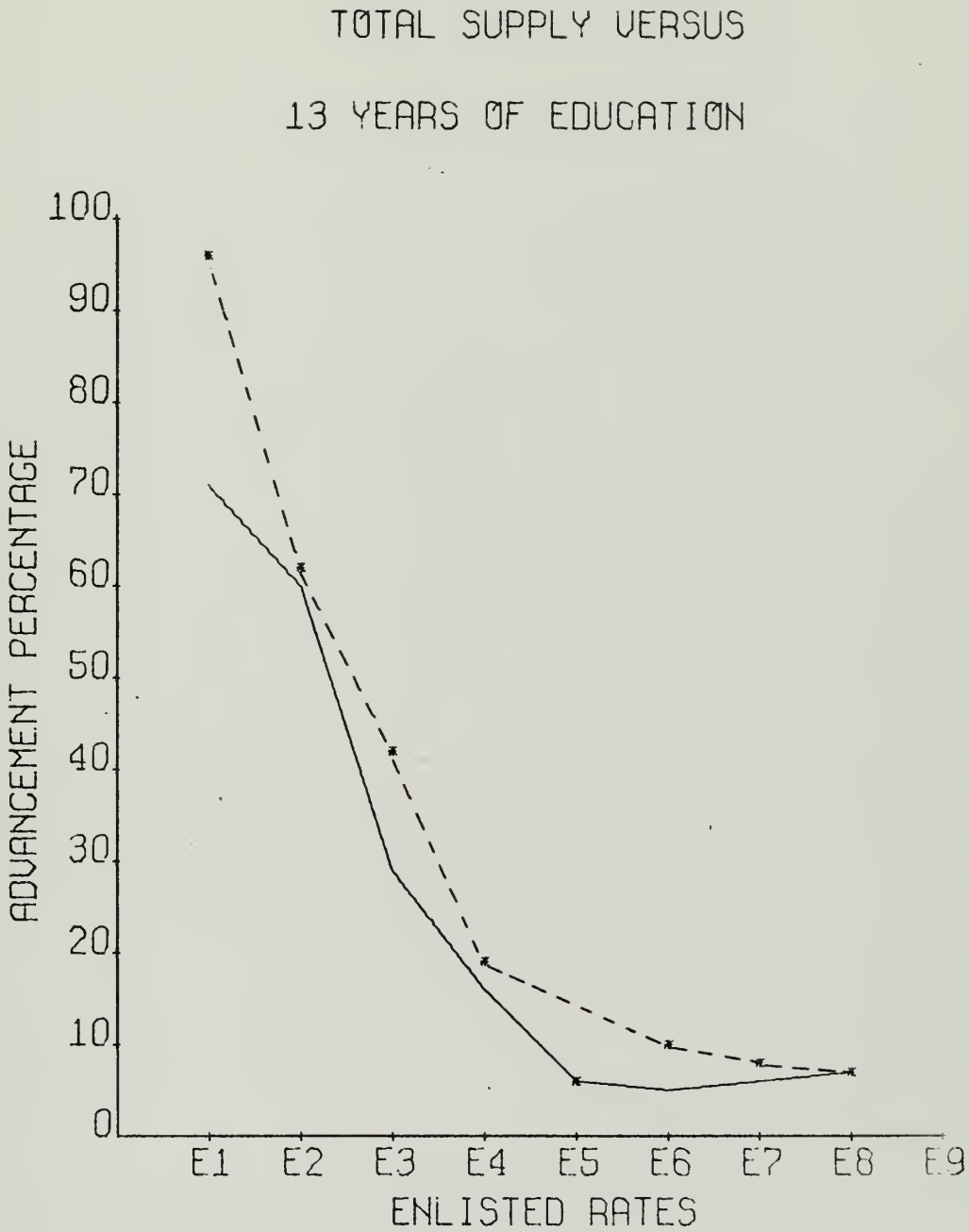
TOTAL SUPPLY VERSUS
13 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 50

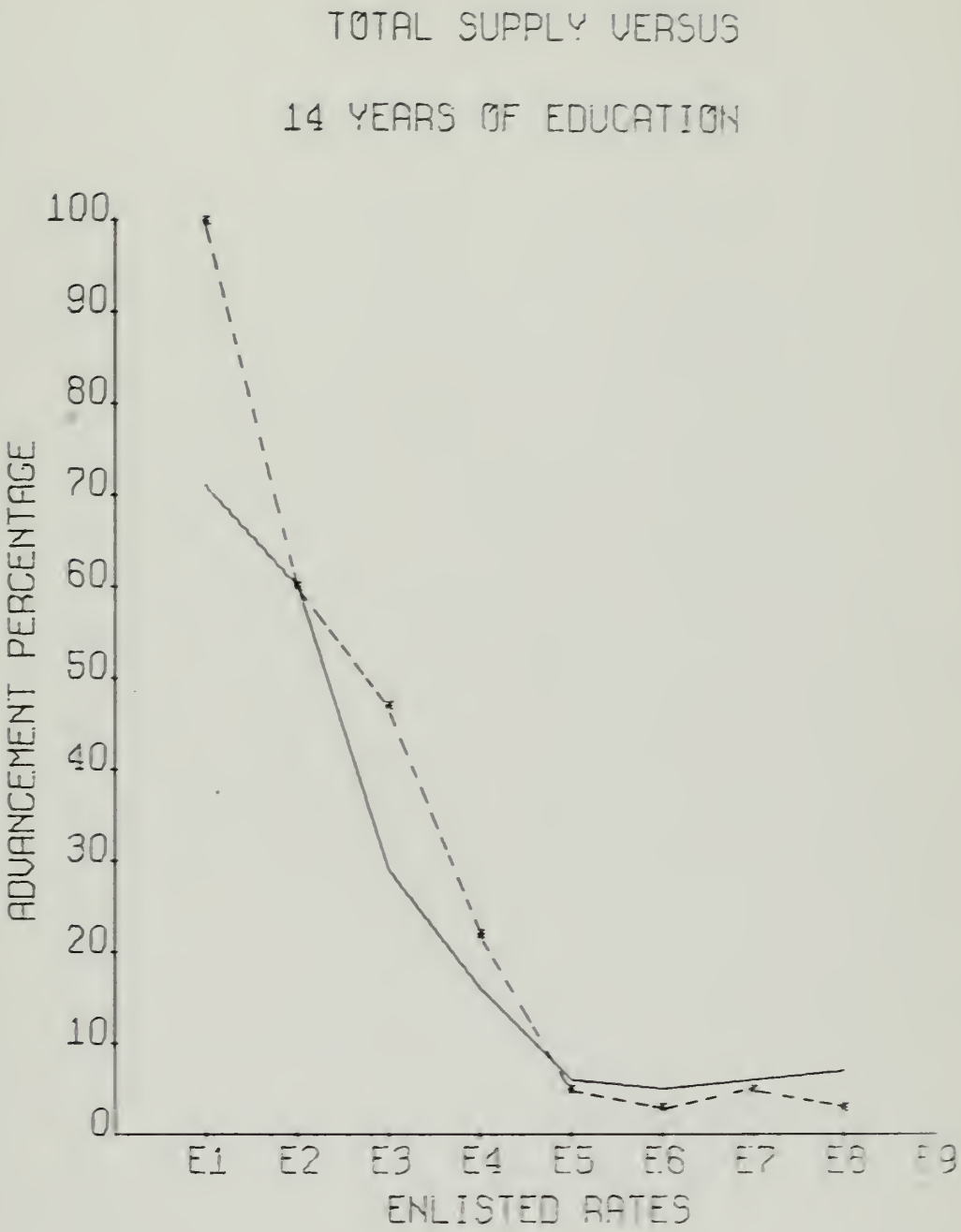
TOTAL SUPPLY VERSUS
14 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 51

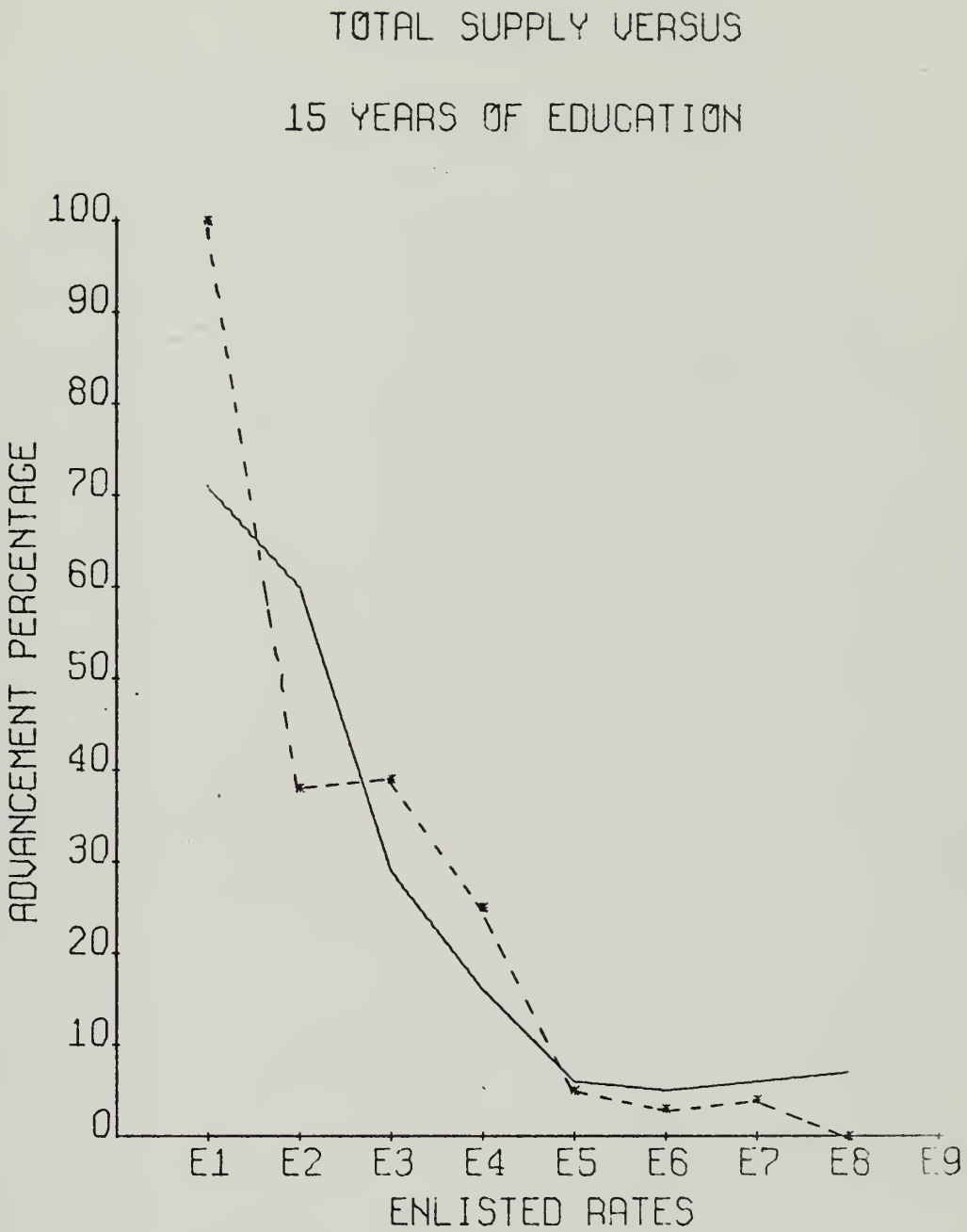
TOTAL SUPPLY VERSUS
15 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 52

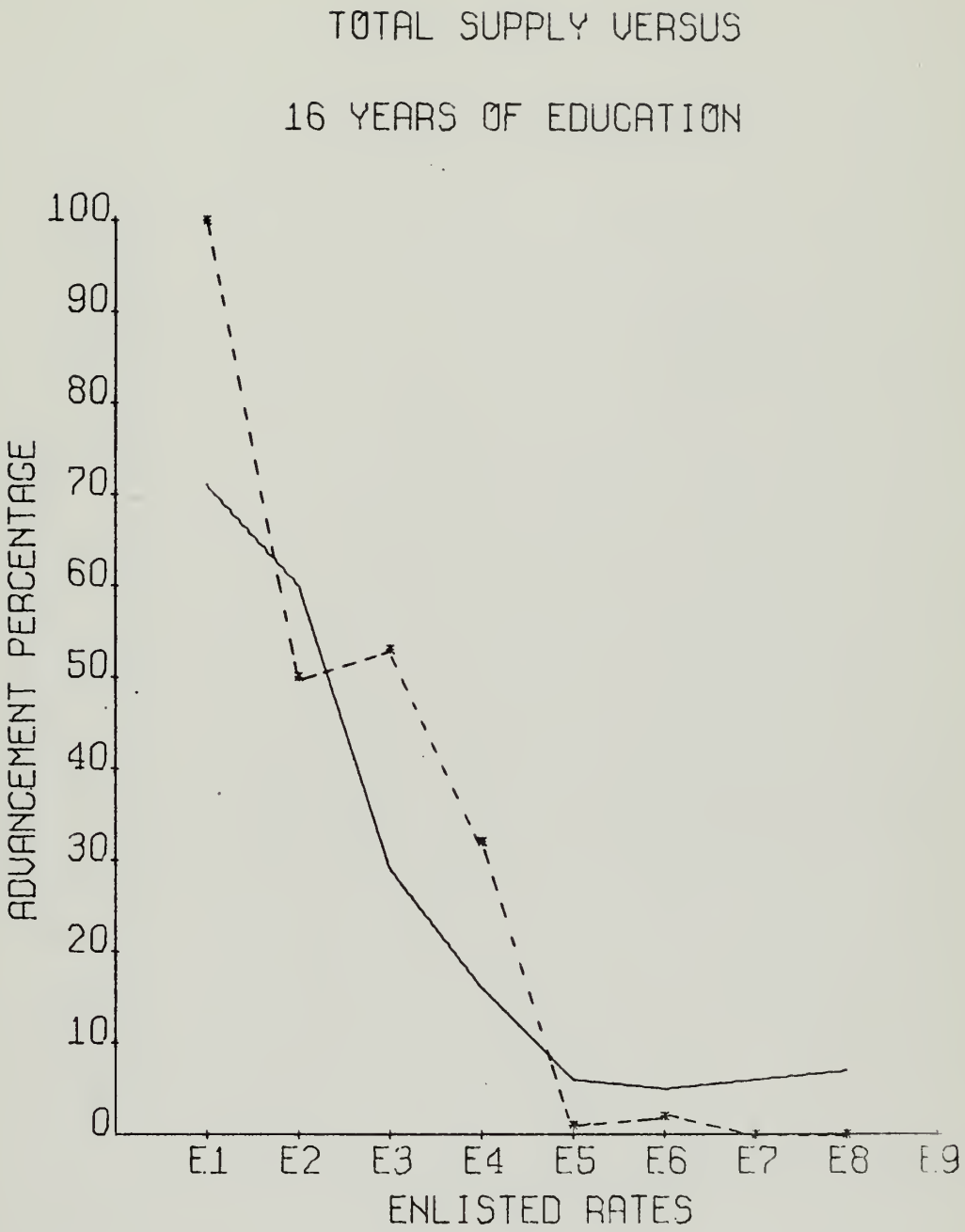
TOTAL SUPPLY VERSUS
16 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 53

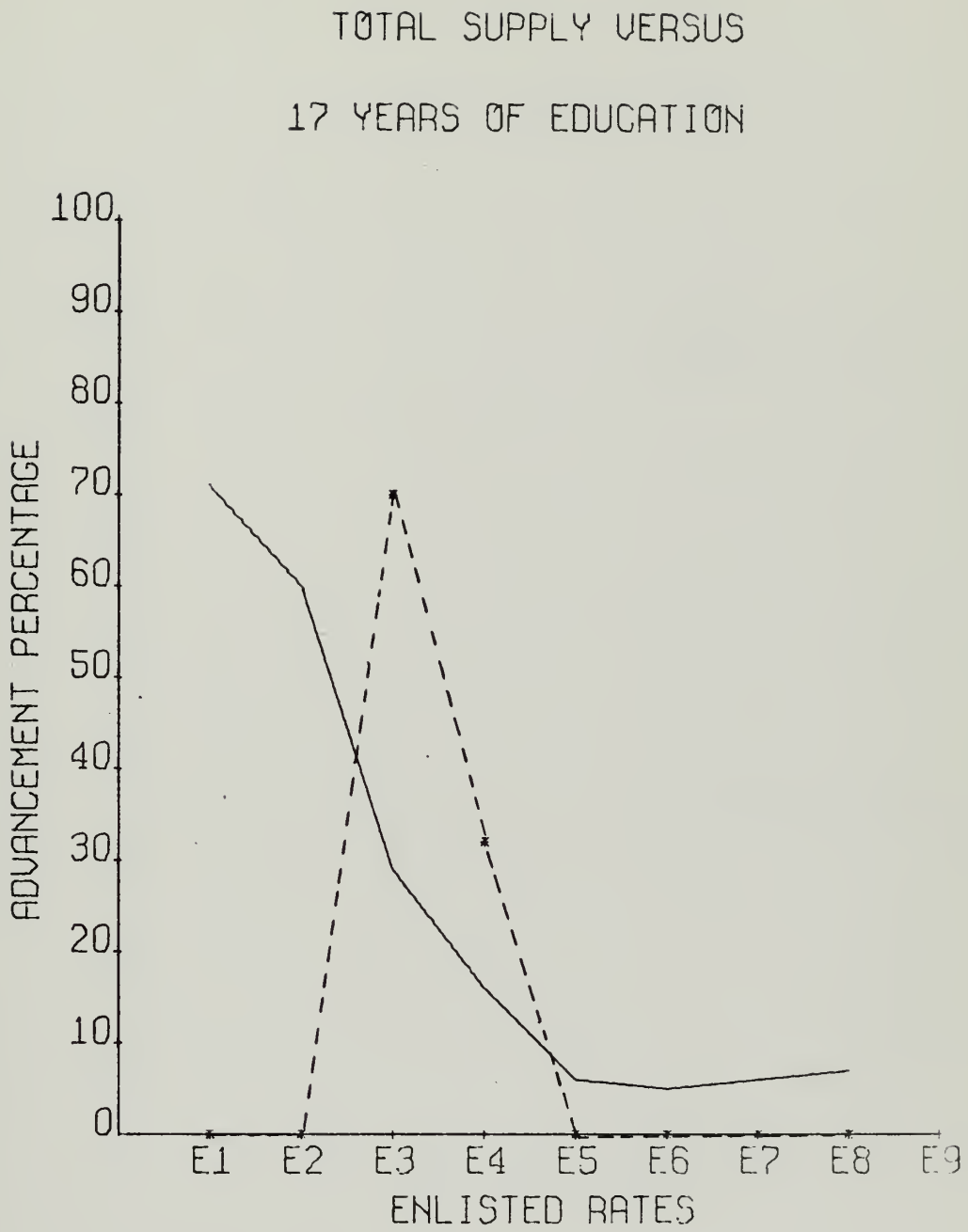
TOTAL SUPPLY VERSUS
17 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 54

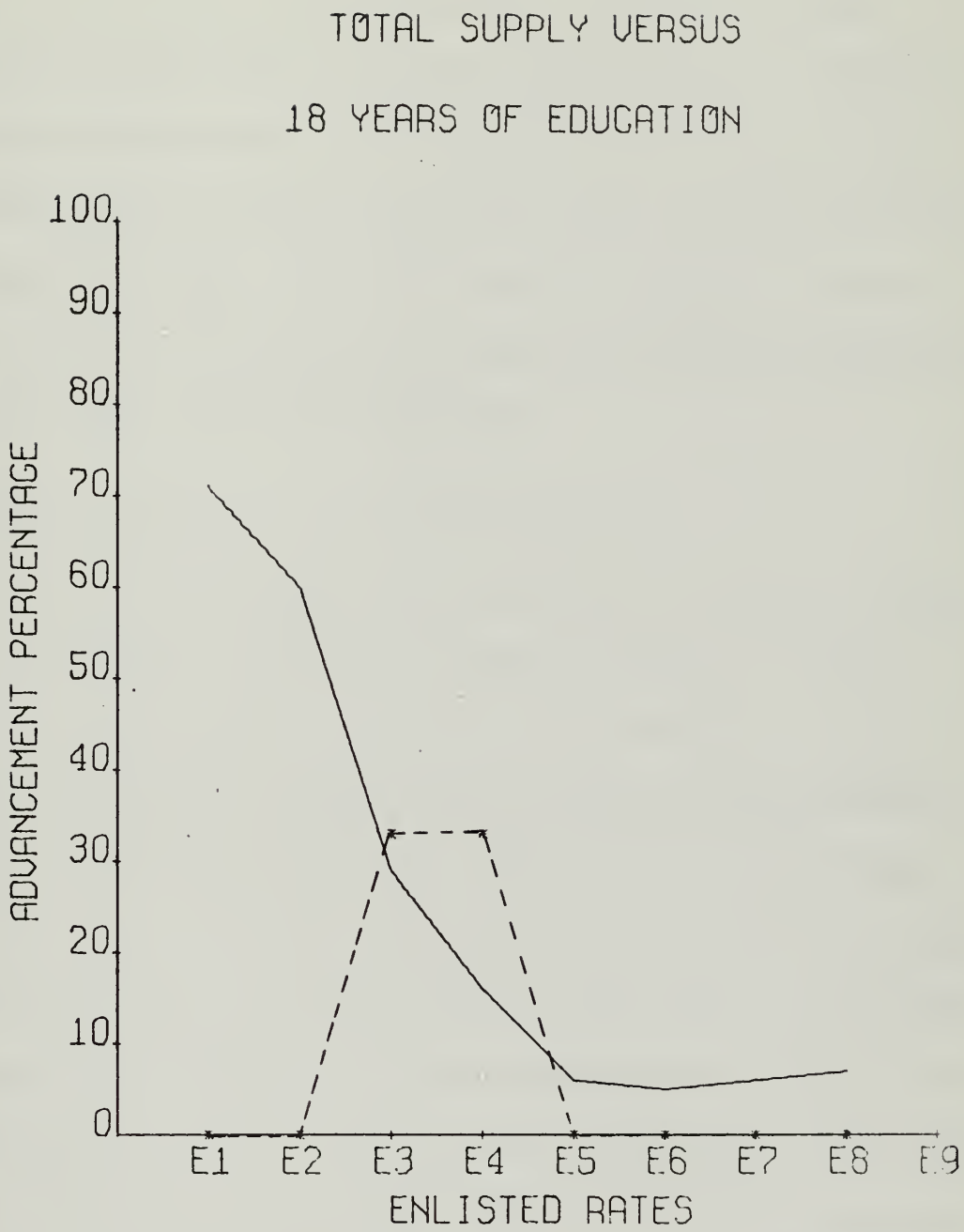
TOTAL SUPPLY VERSUS
18 YEARS OF EDUCATION
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 55

rates E5 thru E8 the higher advancement percentages were for personnel with 13 or less years of education. This was not really unexpected again owing to the fact that Supply ratings are in general the non-technical ratings in the Navy and hence personnel of lower education would be assigned and remain in these ratings while personnel with higher education would either transfer to technical ratings or leave the Navy, thus giving greater opportunity for advancement to the personnel with a lower level of education.

H. SUPPLY RATINGS: ENLISTMENT NUMBER

Table 10 lists the advancement percentages for Supply personnel for each enlistment. This data is plotted in Figures 56 thru 63.

In reviewing the graphs produced it was observed that as the number of enlistments increased the percentages of advancement in the lower rates decreased to zero. This would be expected since personnel in the lower rates would generally not be allowed to reenlist. Of interest, also, are personnel showing in the upper rates during the first and second enlistment, since normally a person in the first and second enlistment would not have sufficient time to achieve the higher rates. Two factors could account for this: (a) reservists coming on active duty after considerable reserve time and (b) error in recording number of enlistments.

ADVANCEMENT PERCENTAGES BY NUMBER OF ENLISTMENT
(number of data points in each group)

Rate / Number	E1	E2	E3	E4	E5	E6	E7	E8
1	75	60	29	16	2	2	7	13
	(191)	(2121)	(11250)	(10779)	(5131)	(474)	(56)	(8)
2	20	16	34	18	7	4	5	15
	(10)	(19)	(1505)	(2393)	(4422)	(2061)	(152)	(27)
3	0	0	38	13	9	6	6	7
	(3)	(1)	(157)	(841)	(2875)	(4791)	(1184)	(109)
4	0	0	11	13	11	7	8	8
	(1)	(0)	(46)	(258)	(1070)	(3297)	(1907)	(378)
5	0	0	0	5	6	6	5	7
	(0)	(0)	(5)	(21)	(122)	(438)	(666)	(296)
6	0	0	25	0	5	8	4	7
	(0)	(0)	(4)	(6)	(22)	(99)	(205)	(154)
7	0	0	0	0	40	0	5	3
	(0)	(0)	(0)	(1)	(5)	(15)	(45)	(38)
8	0	0	0	0	0	0	50	0
	(0)	(0)	(0)	(0)	(0)	(1)	(2)	(1)

Table 10

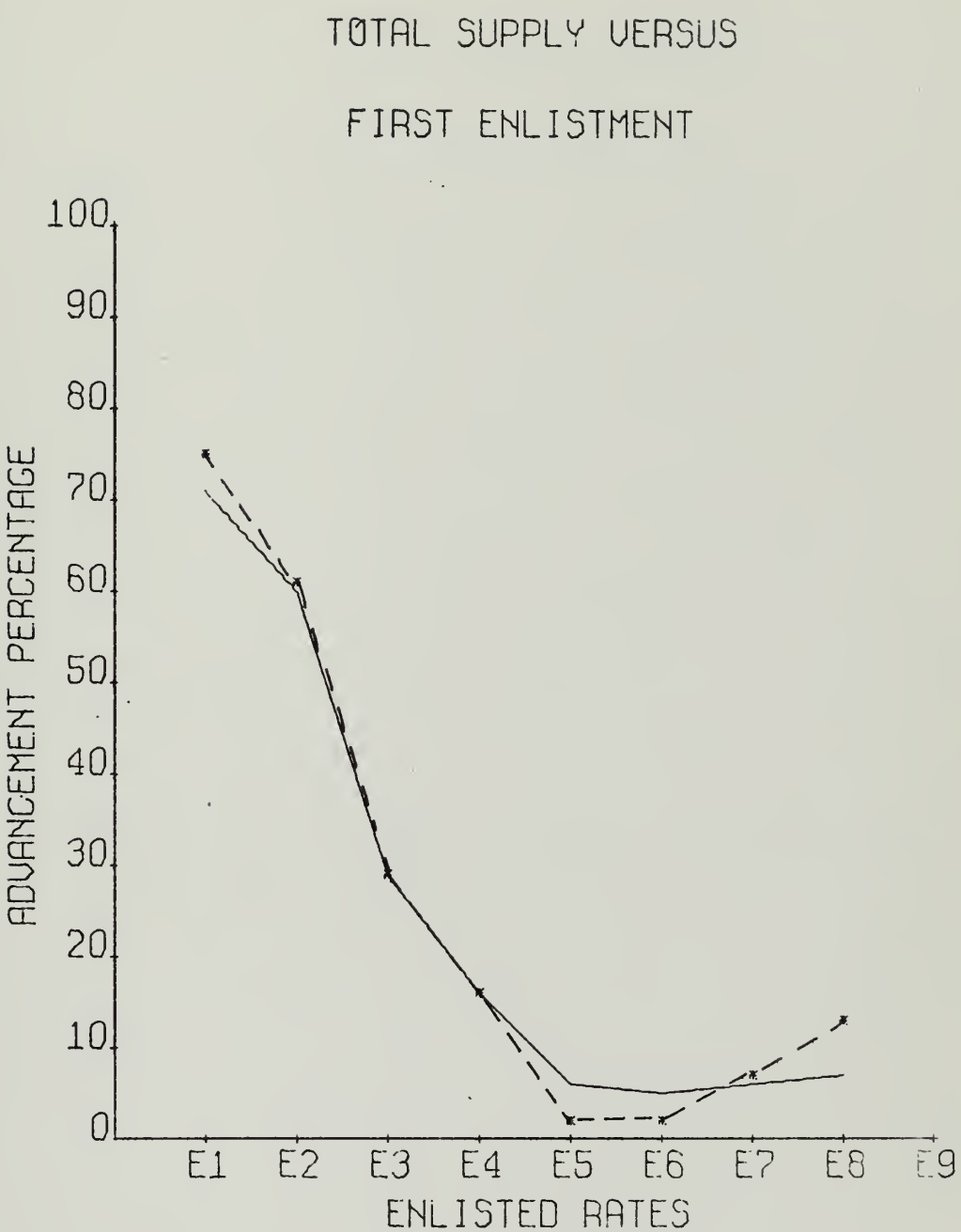
TOTAL SUPPLY VERSUS
FIRST ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 56

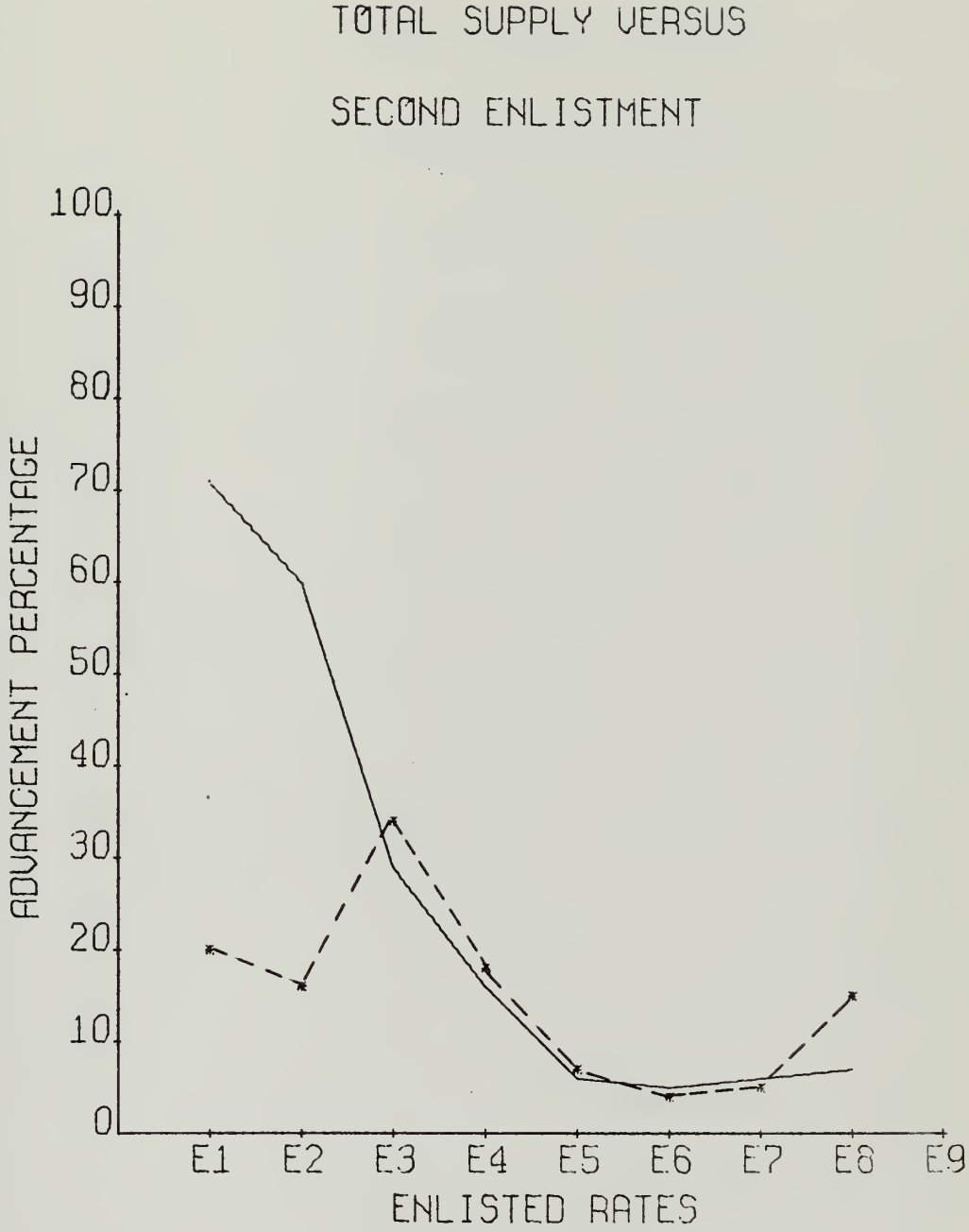
TOTAL SUPPLY VERSUS
SECOND ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 57

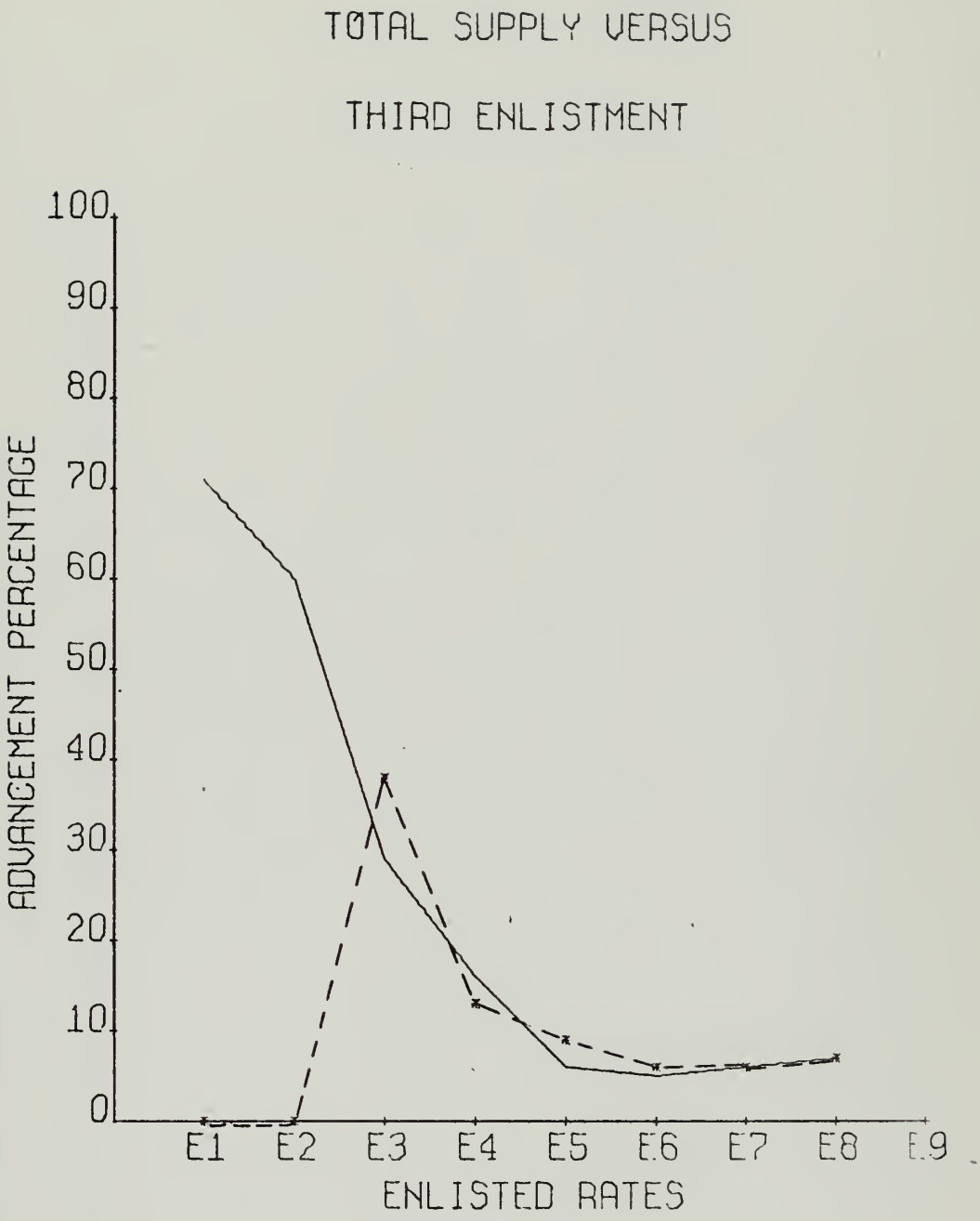
TOTAL SUPPLY VERSUS
THIRD ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 58

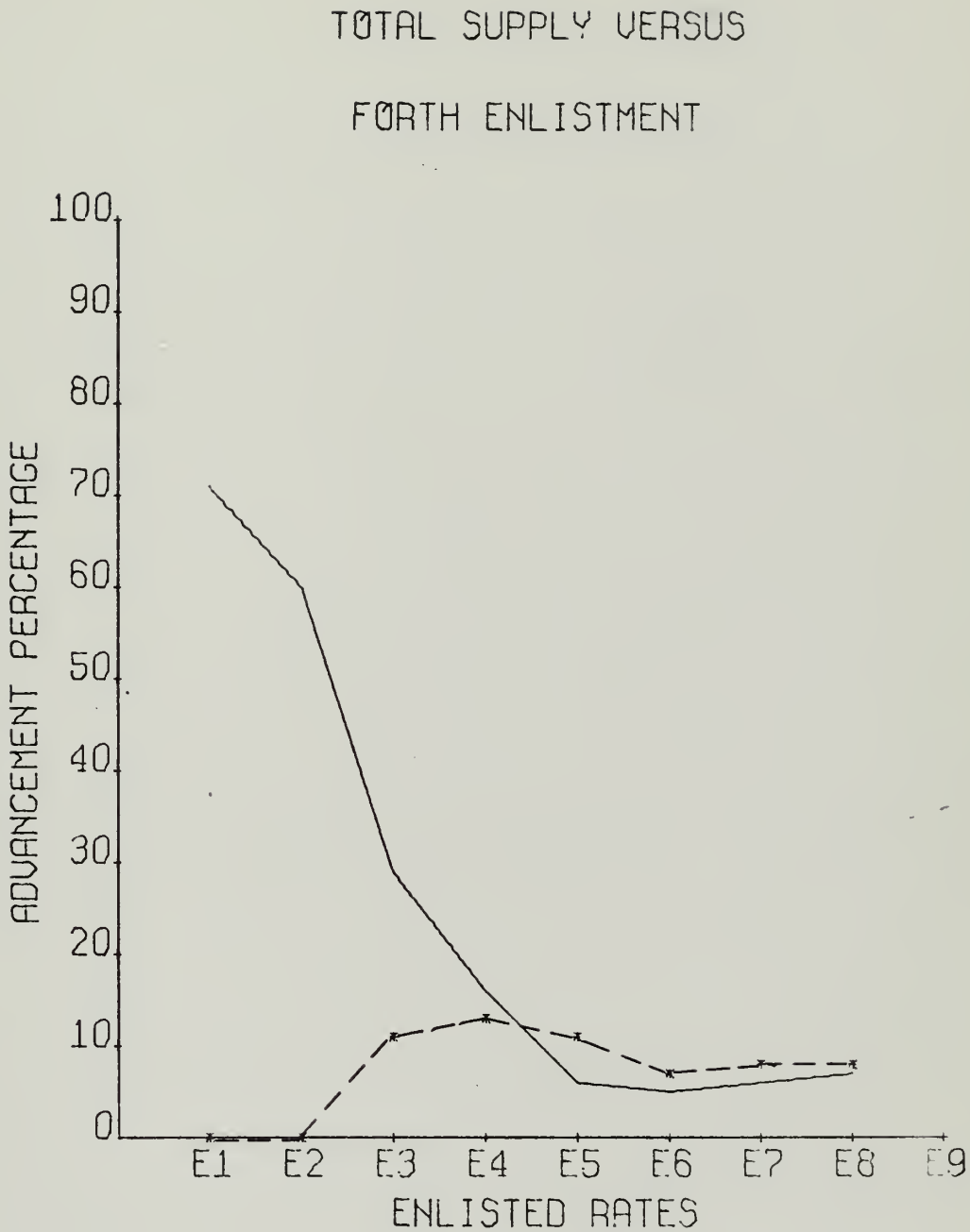
TØTAL SUPPLY VERSUS
FØRTH ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 59

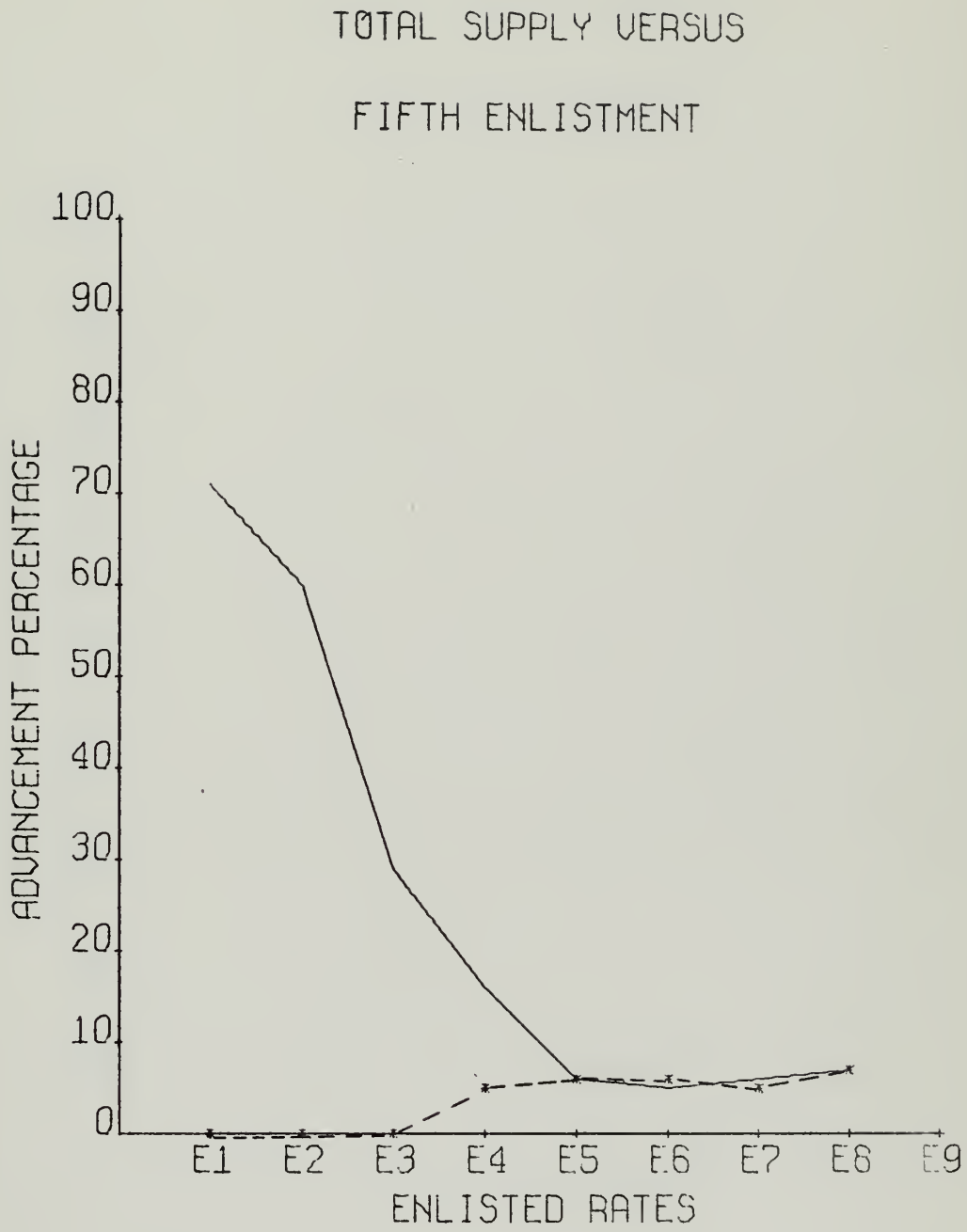
TOTAL SUPPLY VERSUS
FIFTH ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 60

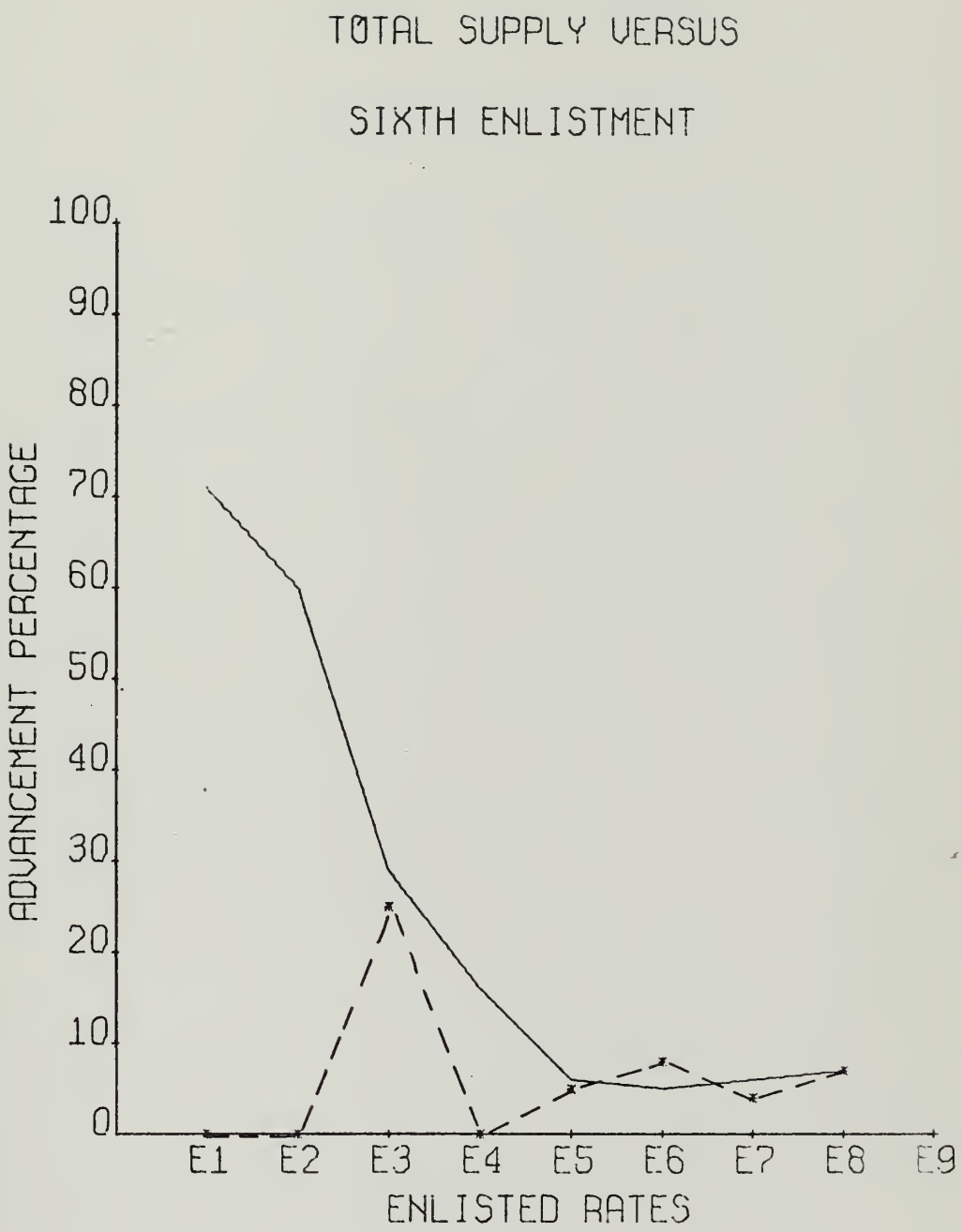
TOTAL SUPPLY VERSUS
SIXTH ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 61

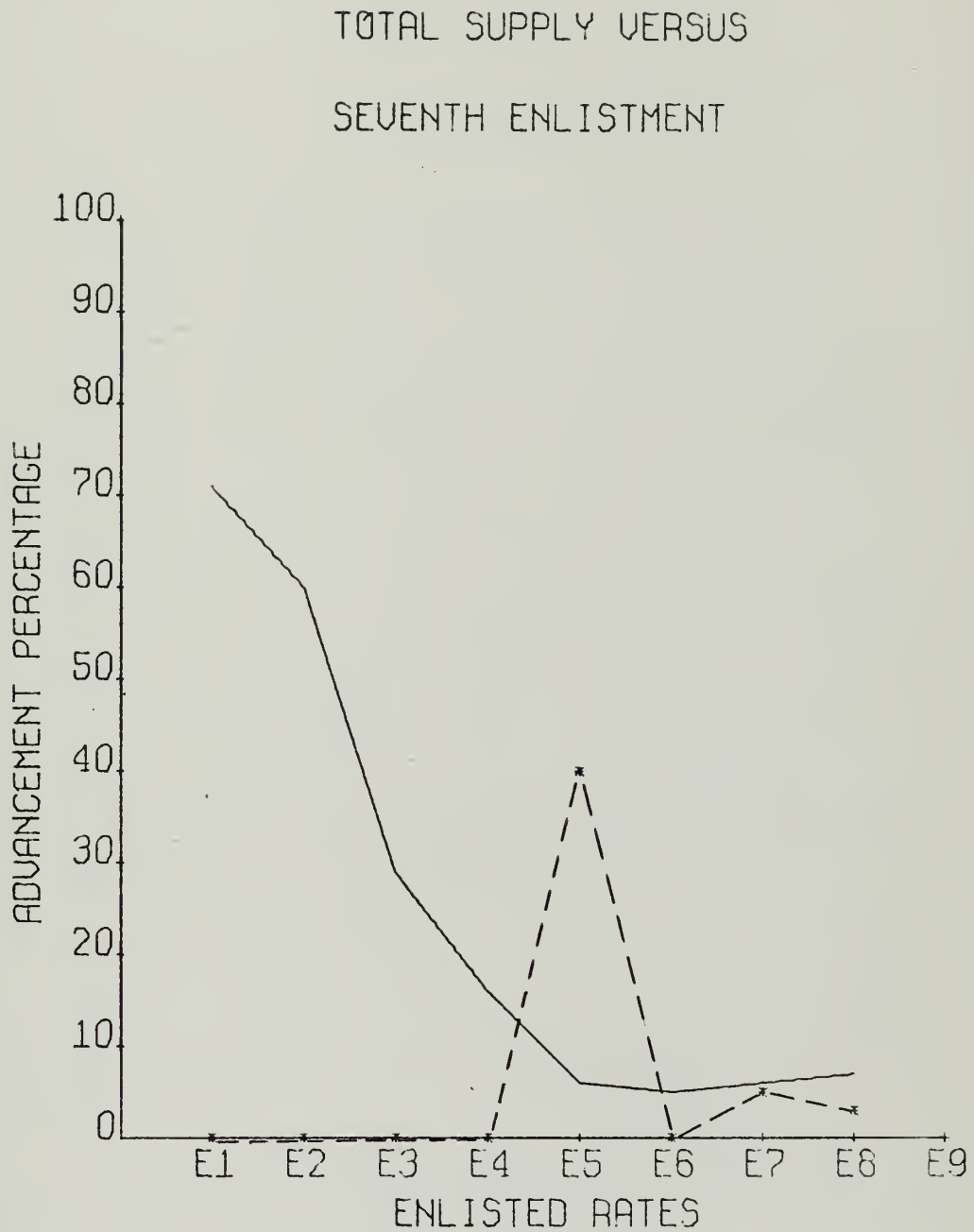
TOTAL SUPPLY VERSUS
SEVENTH ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 62

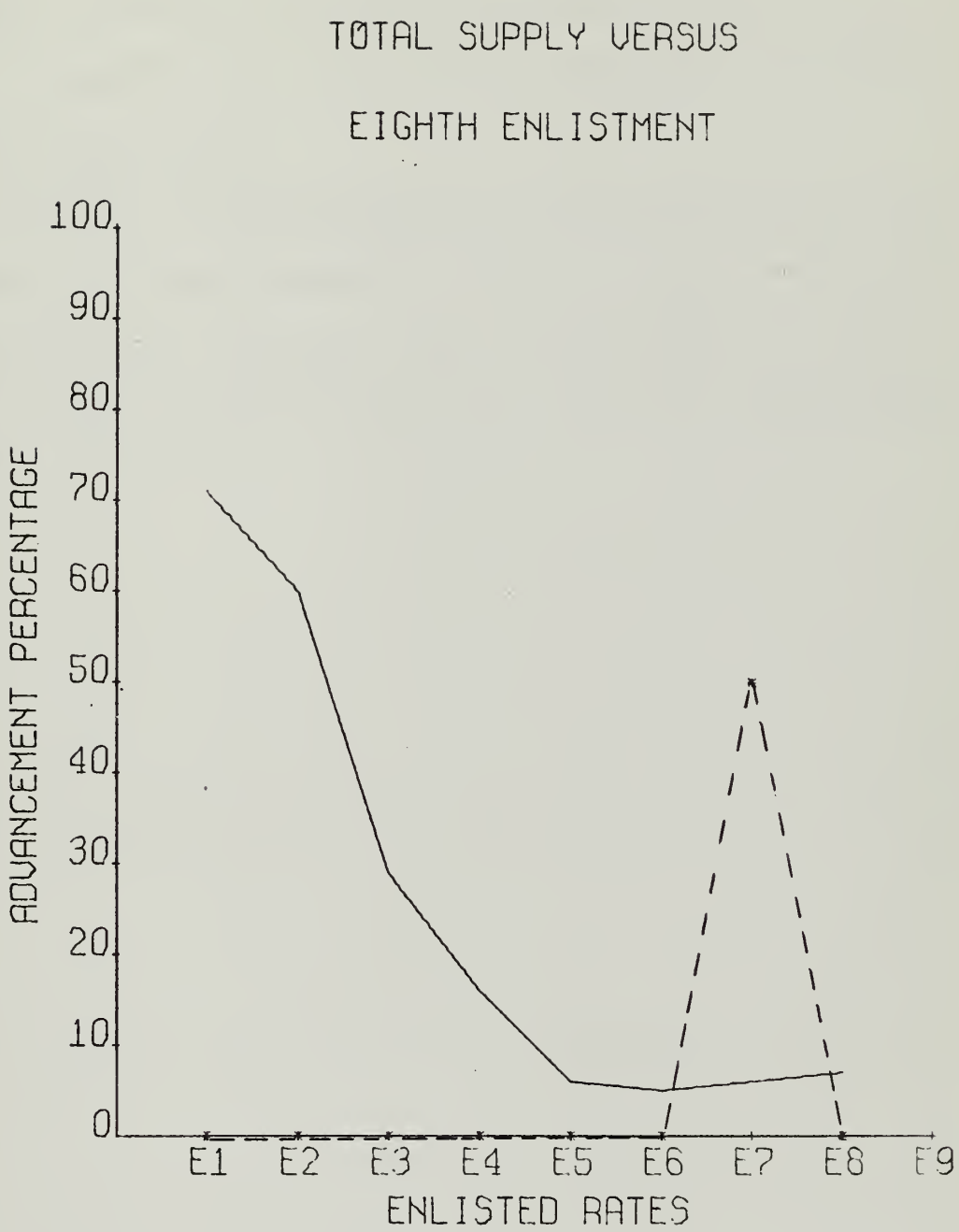
TOTAL SUPPLY VERSUS
EIGHTH ENLISTMENT
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 63

I. SUPPLY RATINGS: AGE AT ENLISTMENT

Table 11 lists the advancement percentages of Supply personnel for age at enlistment from ages 17 thru 34. These data are plotted in Figures 64 through 81.

In reviewing the graphs produced it was observed that the percentages of personnel advanced tended to increase with age for personnel in the lower rates. In the higher rates, personnel who entered the Navy at a younger age appear to have more nearly equal advancement rates.

ADVANCEMENT PERCENTAGES FOR TOTAL SUPPLY
BY AGE AT ENLISTMENT
(number of data points in each group)

Rate / age	E1	E2	E3	E4	E5	E6	E7	E8
17	20	38	21	19	8	6	9	6
	(5)	(56)	(63)	(194)	(823)	(1140)	(458)	(116)
18	0	56	38	15	8	5	7	7
	(8)	(431)	(1035)	(1701)	(2135)	(2291)	(949)	(253)
19	25	59	32	13	5	5	8	13
	(16)	(631)	(2841)	(3922)	(3028)	(2076)	(785)	(216)
20	64	60	32	17	5	6	8	4
	(33)	(510)	(2852)	(3178)	(2402)	(1466)	(589)	(119)
21	68	67	27	16	5	6	4	8
	(31)	(241)	(1893)	(1683)	(1534)	(986)	(377)	(76)
22	89	63	25	22	6	5	3	2
	(37)	(126)	(1308)	(1200)	(1141)	(765)	(254)	(56)
23	94	64	25	19	7	6	3	5
	(32)	(70)	(888)	(912)	(861)	(642)	(211)	(44)
24	84	67	26	17	6	4	4	3
	(25)	(33)	(674)	(595)	(593)	(542)	(163)	(35)
25	100	54	24	17	5	6	5	12
	(7)	(22)	(494)	(345)	(388)	(347)	(113)	(17)
26	67	55	17	14	7	6	1	13
	(6)	(11)	(330)	(217)	(228)	(271)	(74)	(16)
27	75	100	22	12	5	4	2	0
	(4)	(2)	(241)	(142)	(157)	(191)	(54)	(15)
28	0	50	20	7	14	2	0	0
	(0)	(2)	(160)	(82)	(121)	(152)	(41)	(6)
29	0	25	25	7	11	4	9	0
	(0)	(4)	(106)	(59)	(84)	(120)	(35)	(7)
30	0	0	21	20	7	3	0	0
	(0)	(0)	(48)	(35)	(61)	(75)	(29)	(8)
31	0	0	12	40	9	6	8	25
	(0)	(0)	(25)	(15)	(33)	(35)	(13)	(4)
32	0	0	0	25	0	0	0	0
	(0)	(0)	(1)	(4)	(8)	(8)	(5)	(8)
33	0	0	0	50	25	0	18	0
	(0)	(0)	(0)	(2)	(8)	(17)	(11)	(4)

Table 11

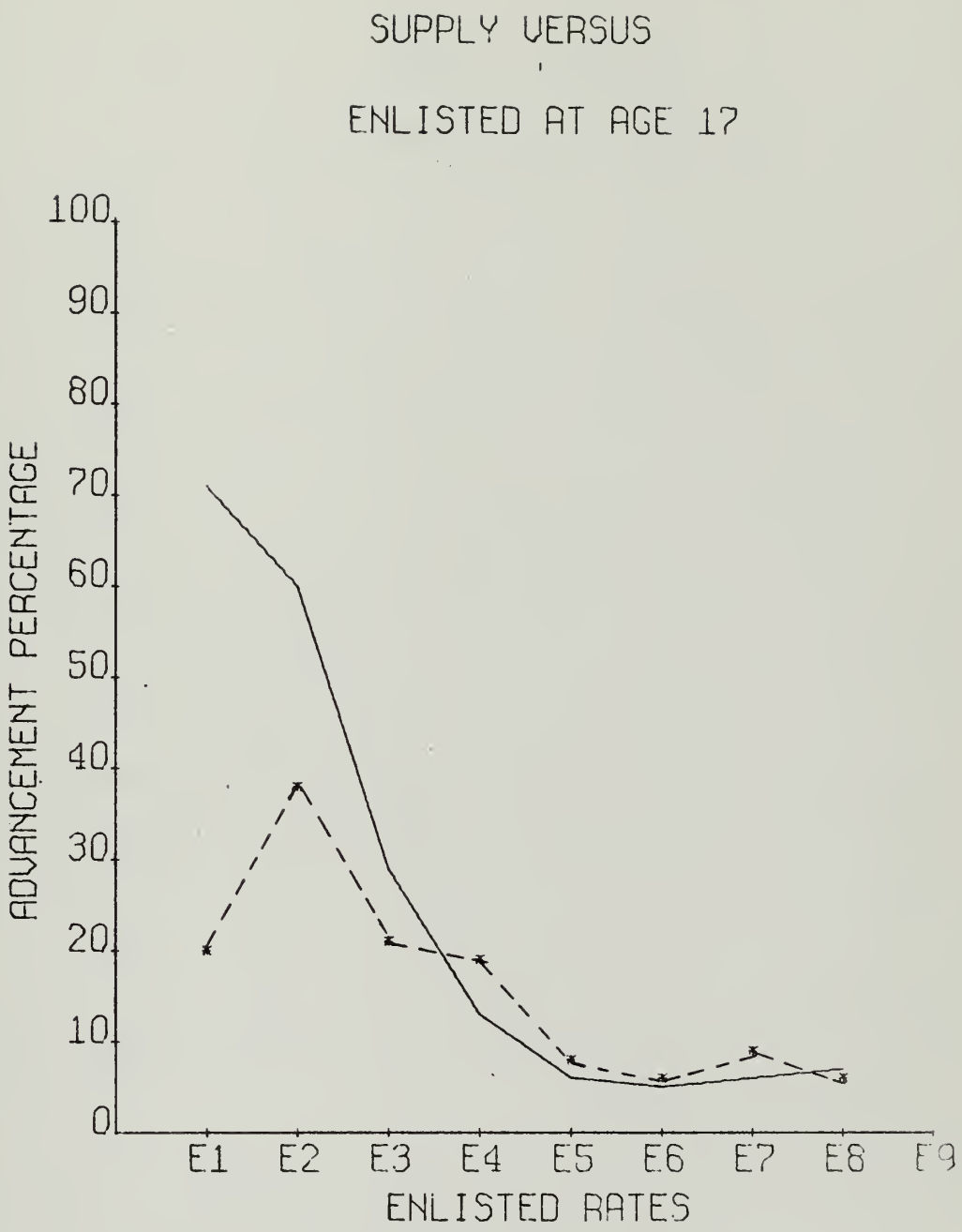
SUPPLY VERSUS
ENLISTED AT AGE 17
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 64

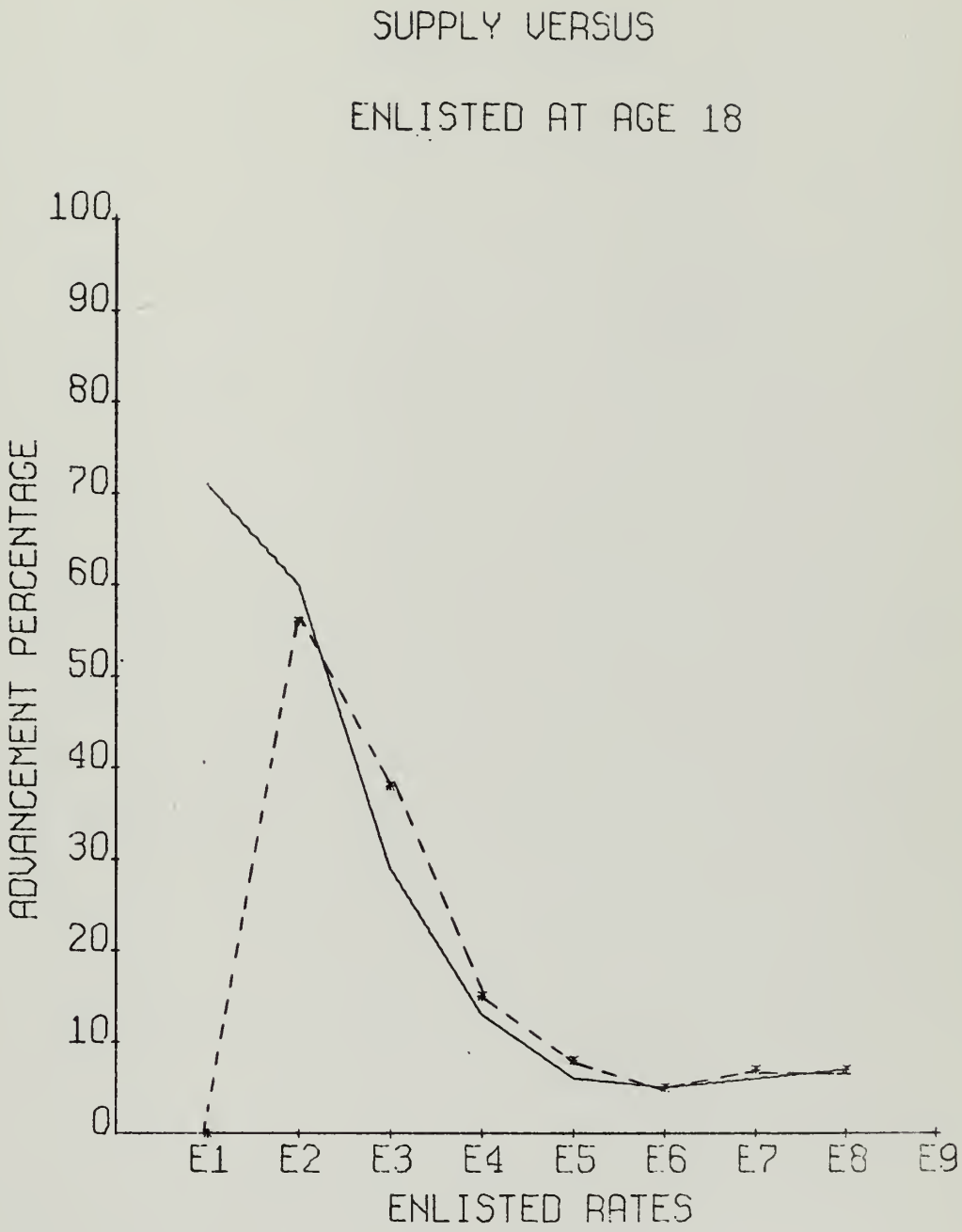
SUPPLY VERSUS
ENLISTED AT AGE 18
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 65

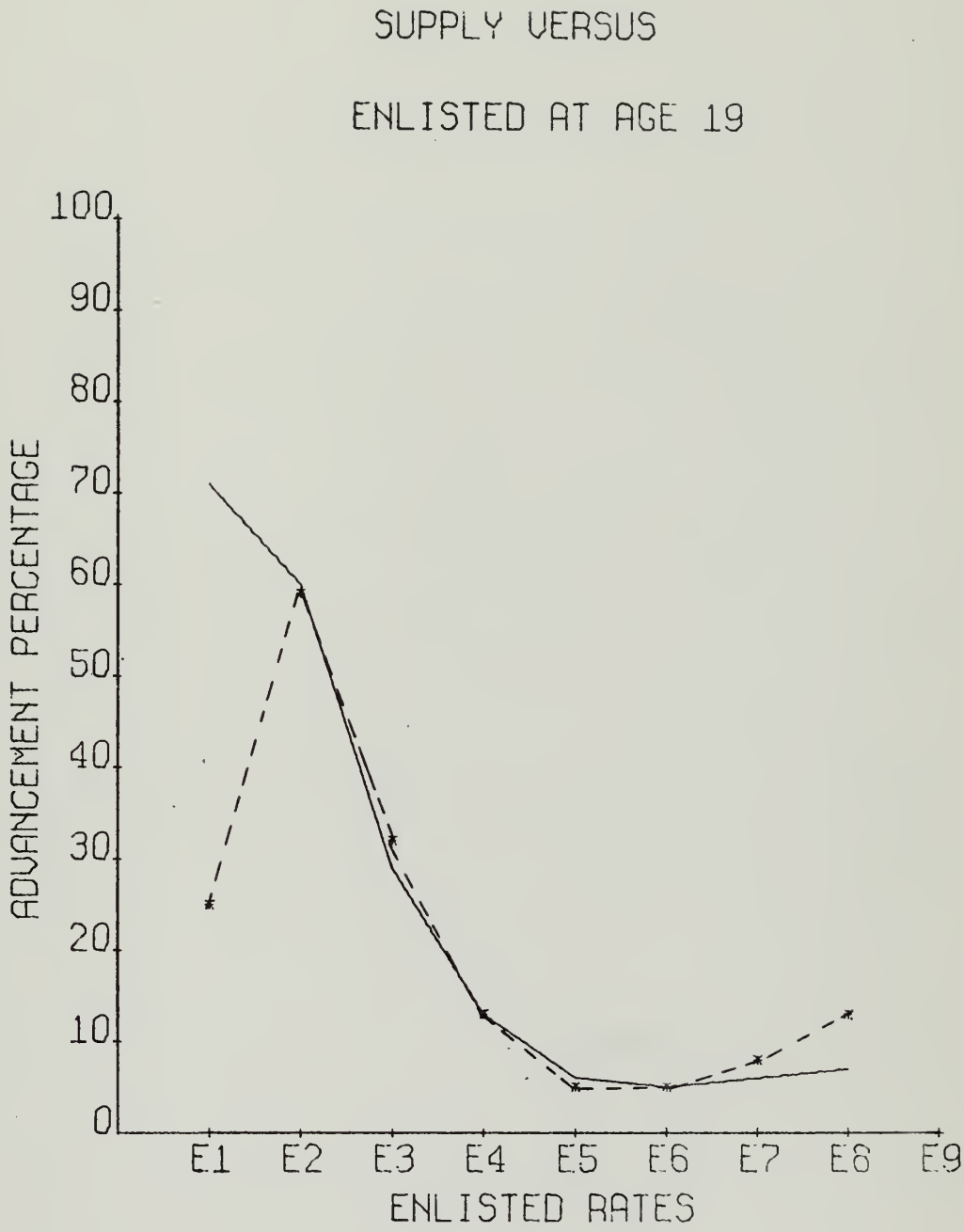
SUPPLY VERSUS
ENLISTED AT AGE 19
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 66

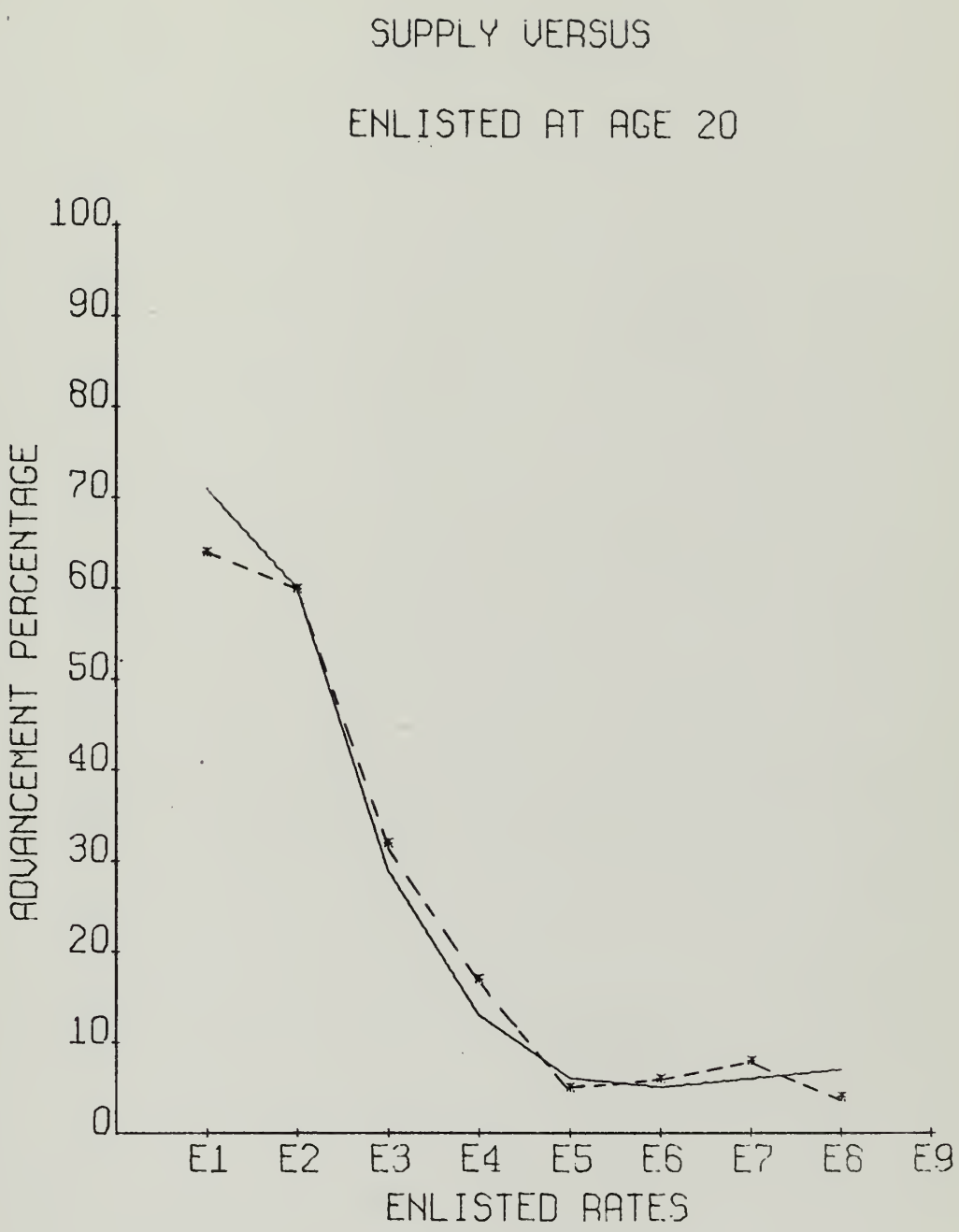
SUPPLY VERSUS
ENLISTED AT AGE 20
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 67

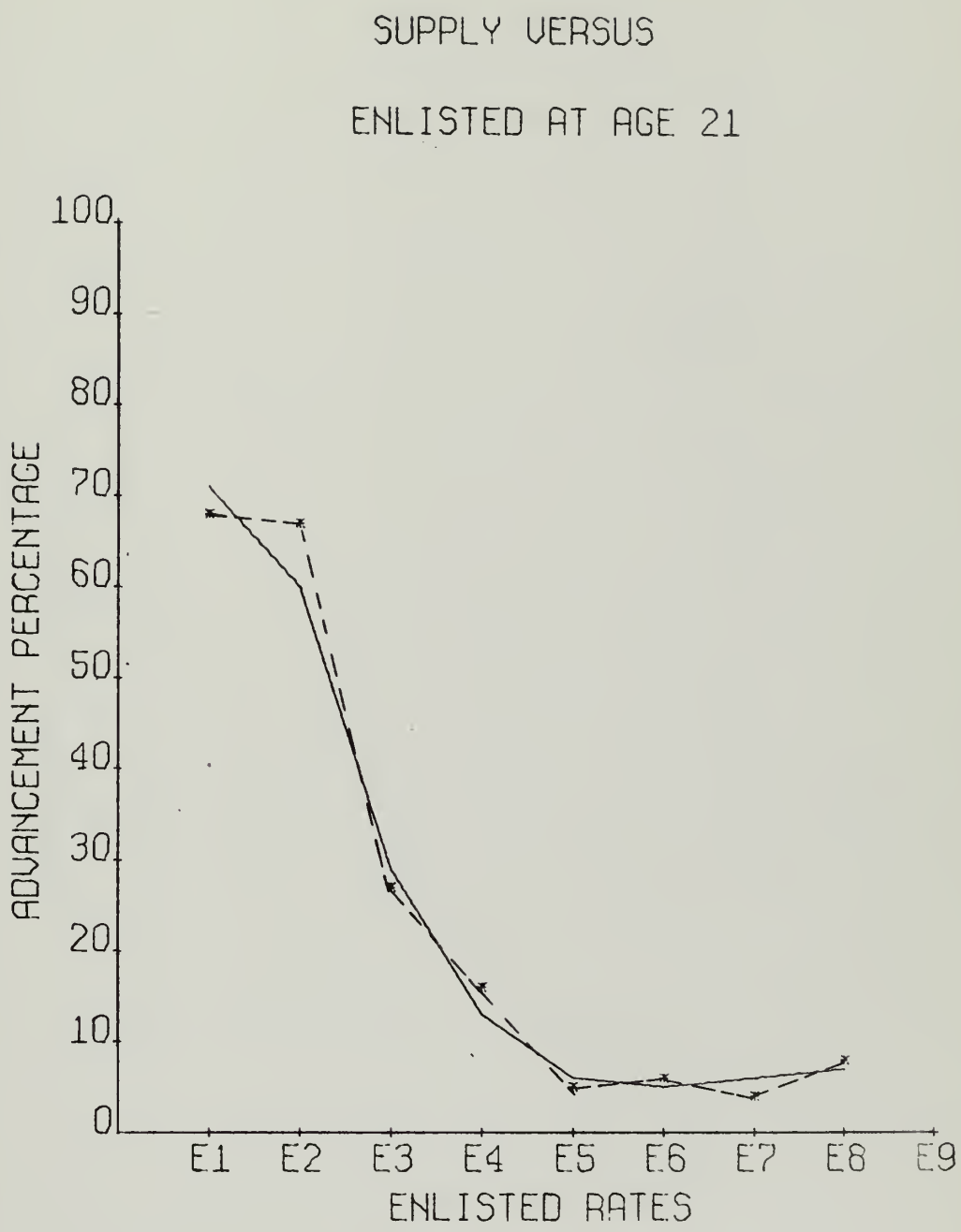
SUPPLY VERSUS
ENLISTED AT AGE 21
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 68

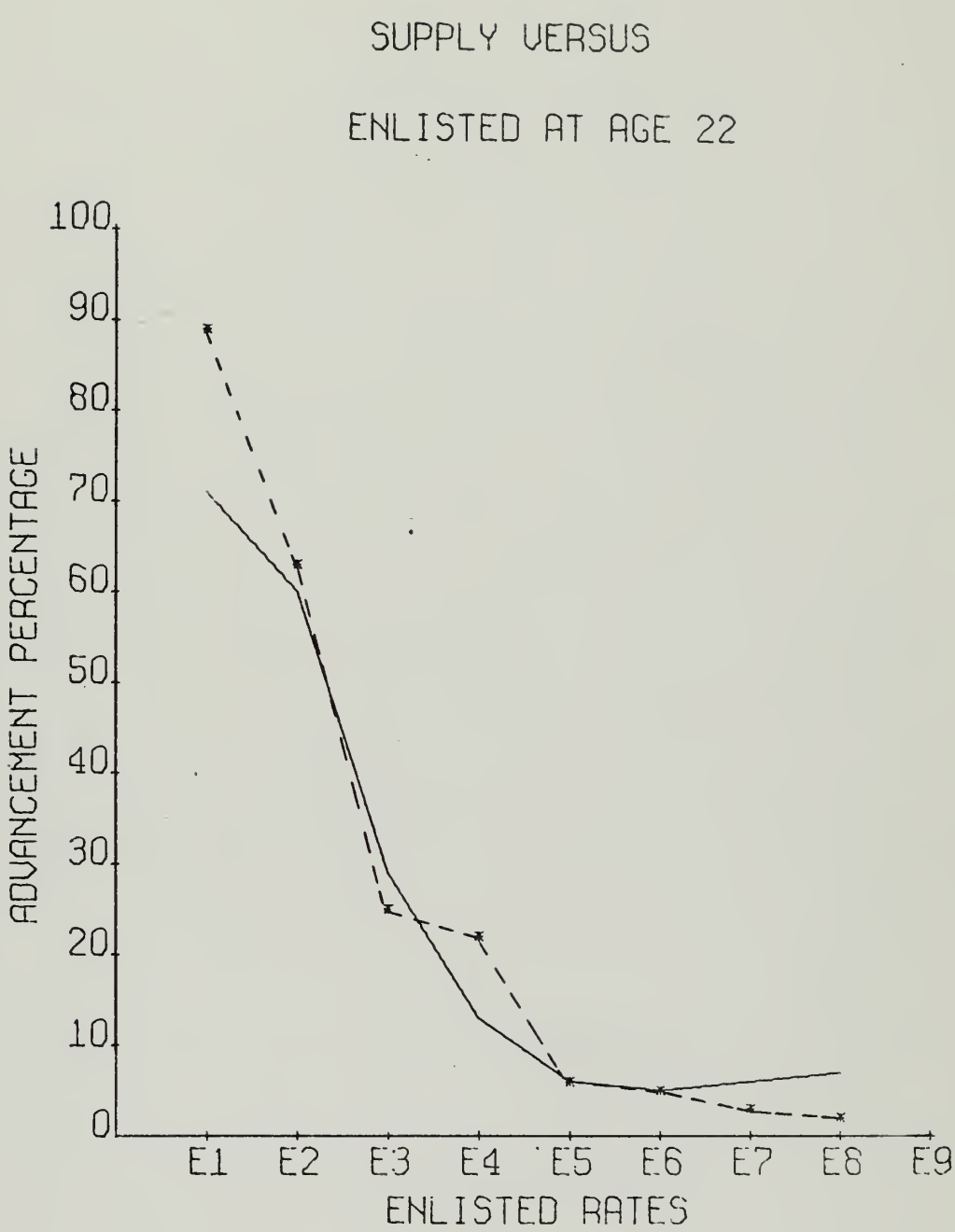
SUPPLY VERSUS
ENLISTED AT AGE 22
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 69

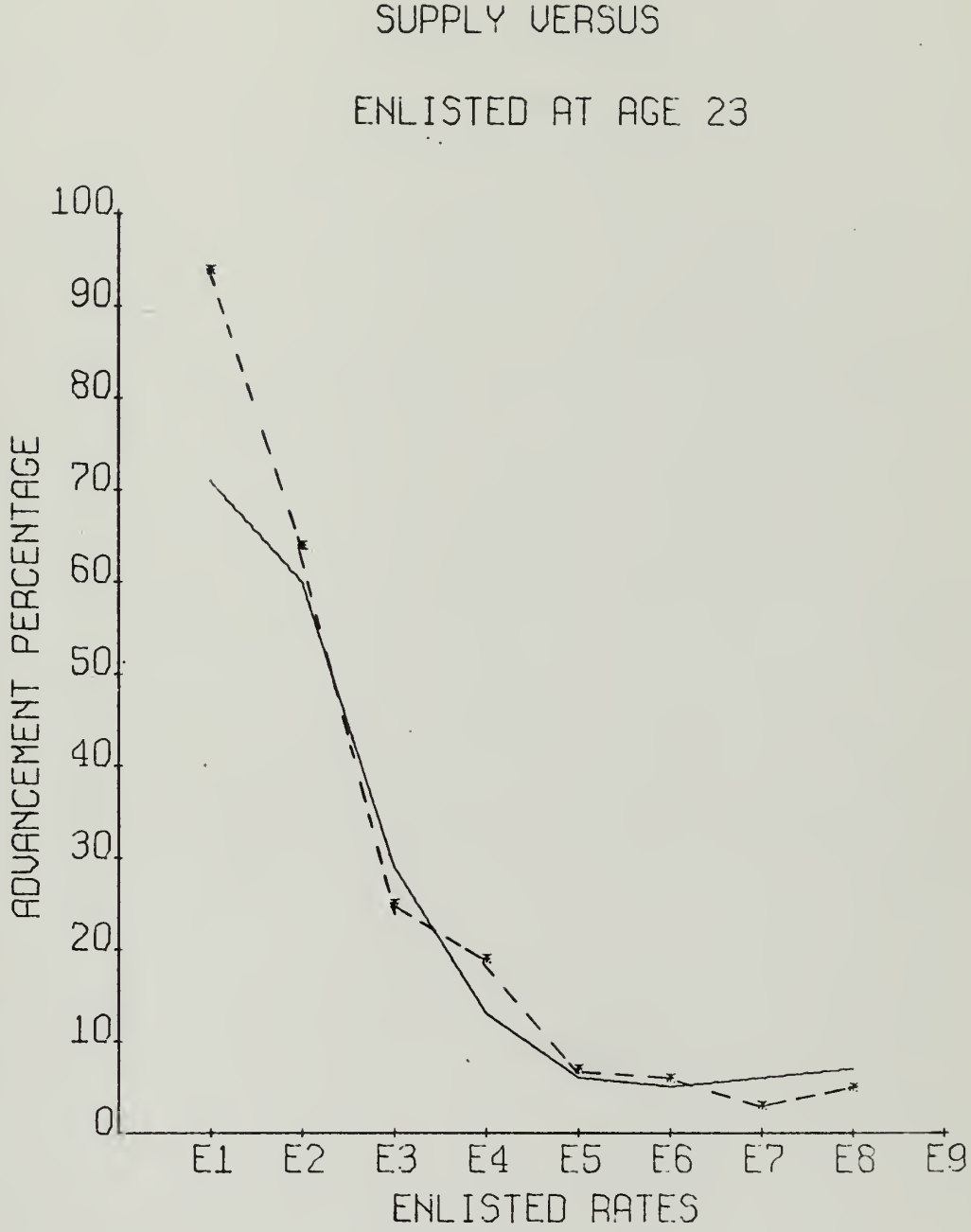
SUPPLY VERSUS
ENLISTED AT AGE 23
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 70

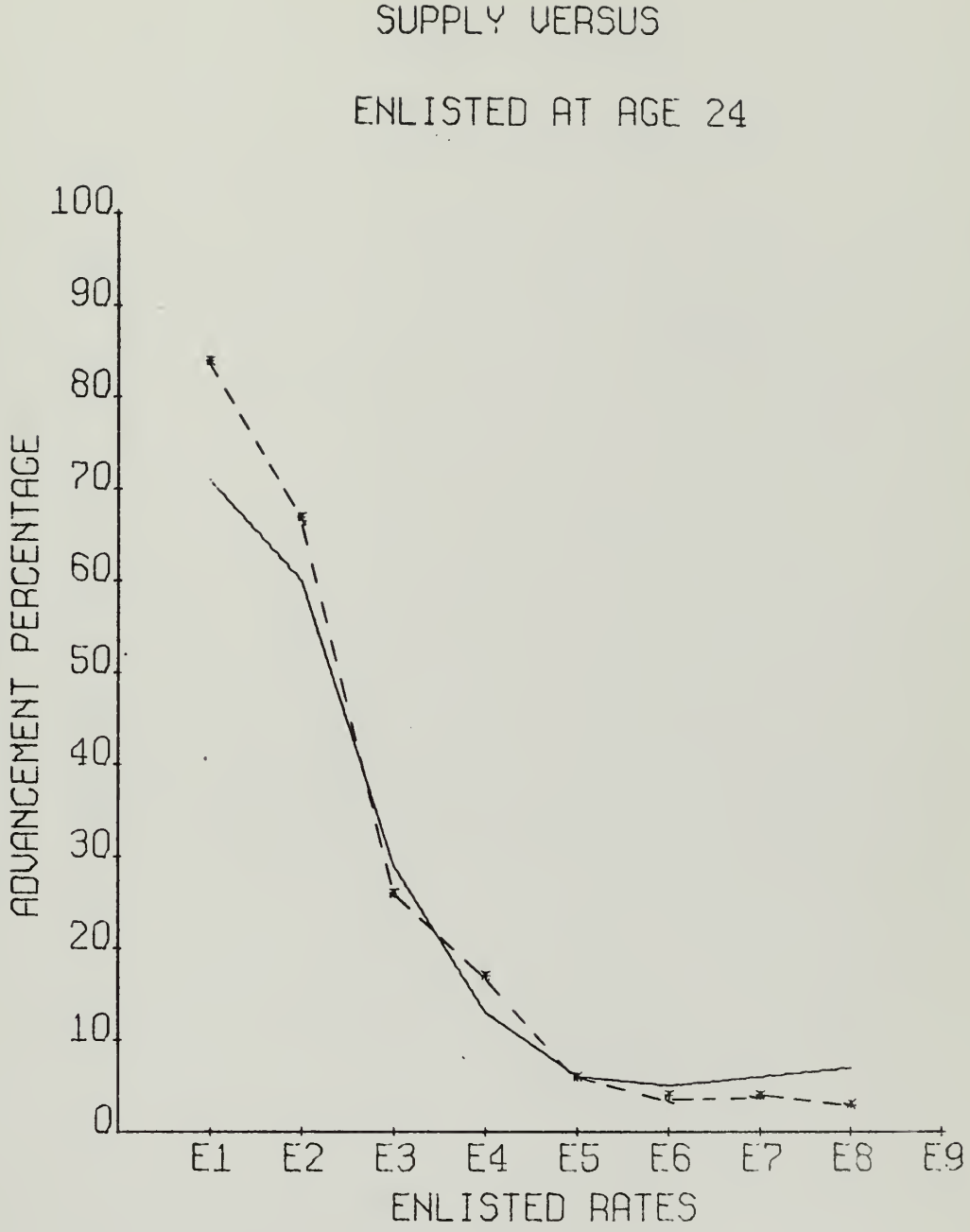
SUPPLY VERSUS
ENLISTED AT AGE 24
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 71

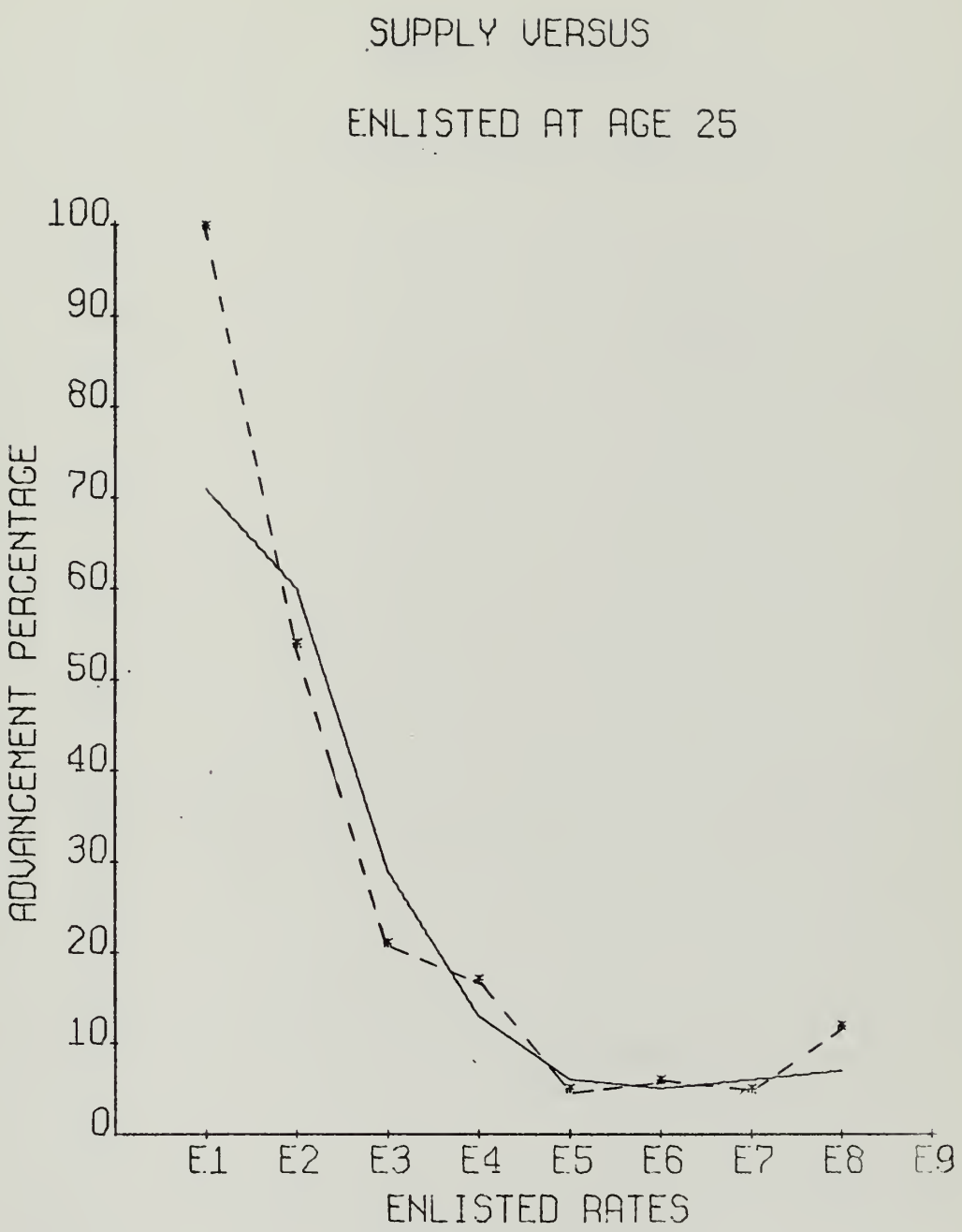
SUPPLY VERSUS
ENLISTED AT AGE 25
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 72

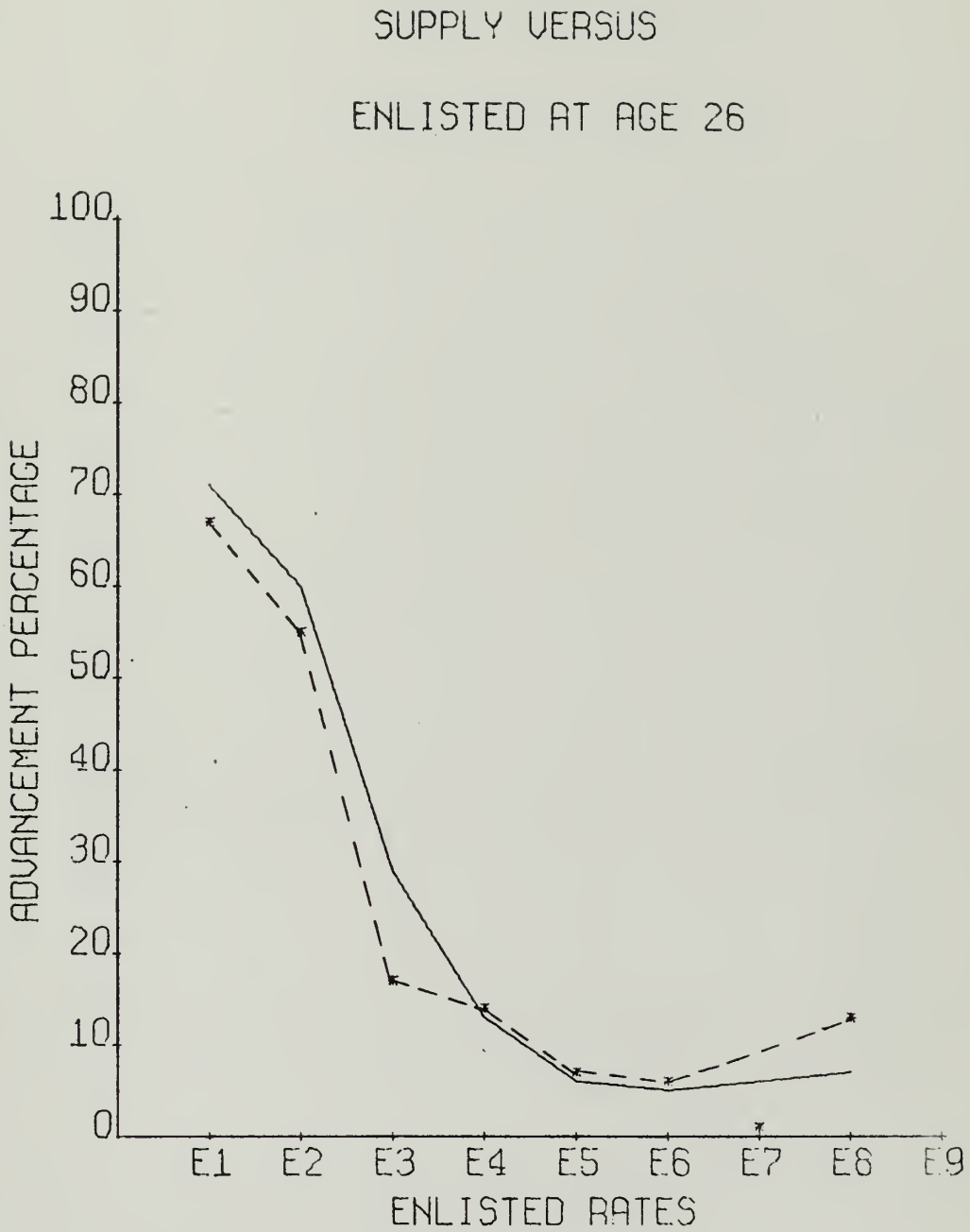
SUPPLY VERSUS
ENLISTED AT AGE 26
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 73

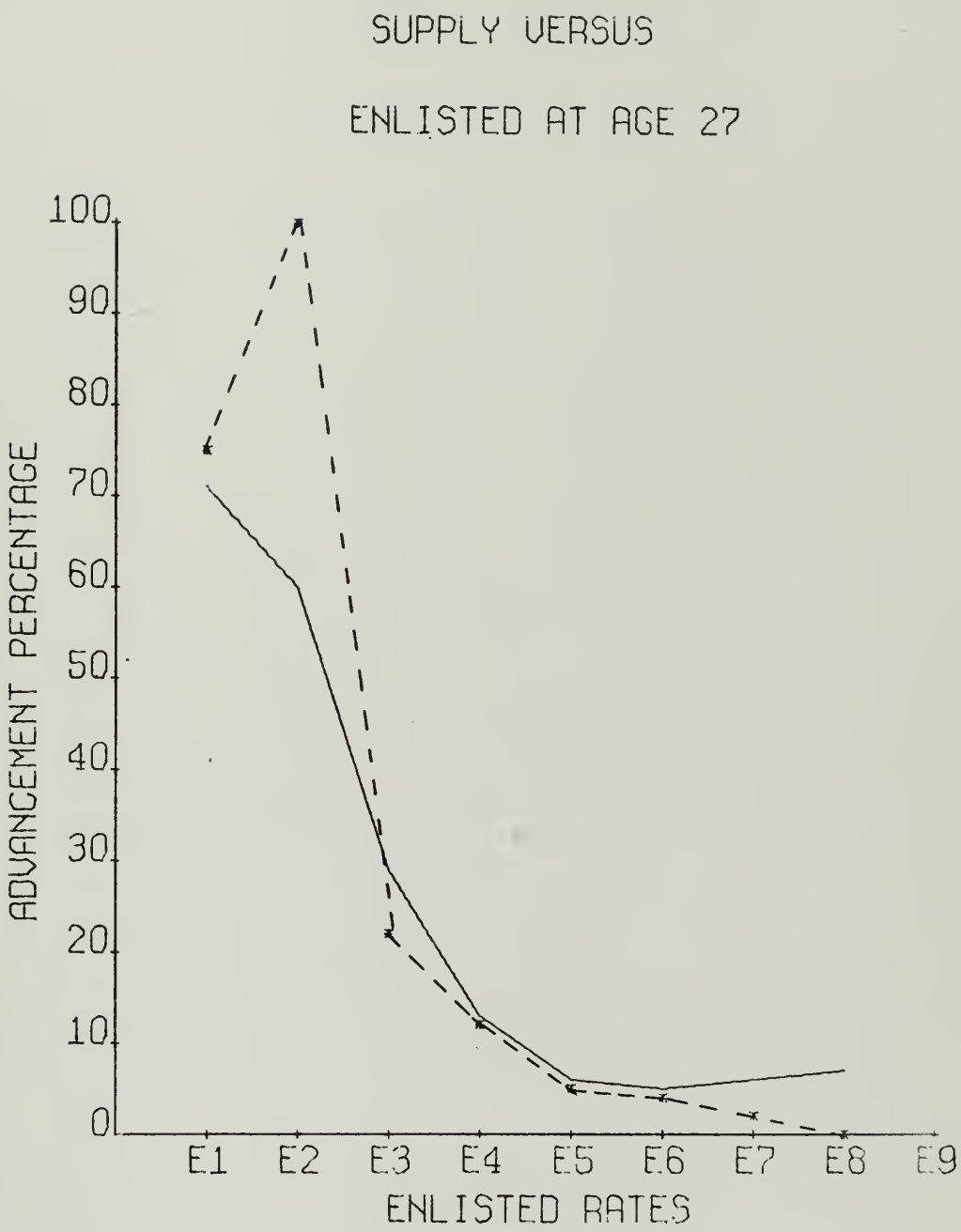
SUPPLY VERSUS
ENLISTED AT AGE 27
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 74

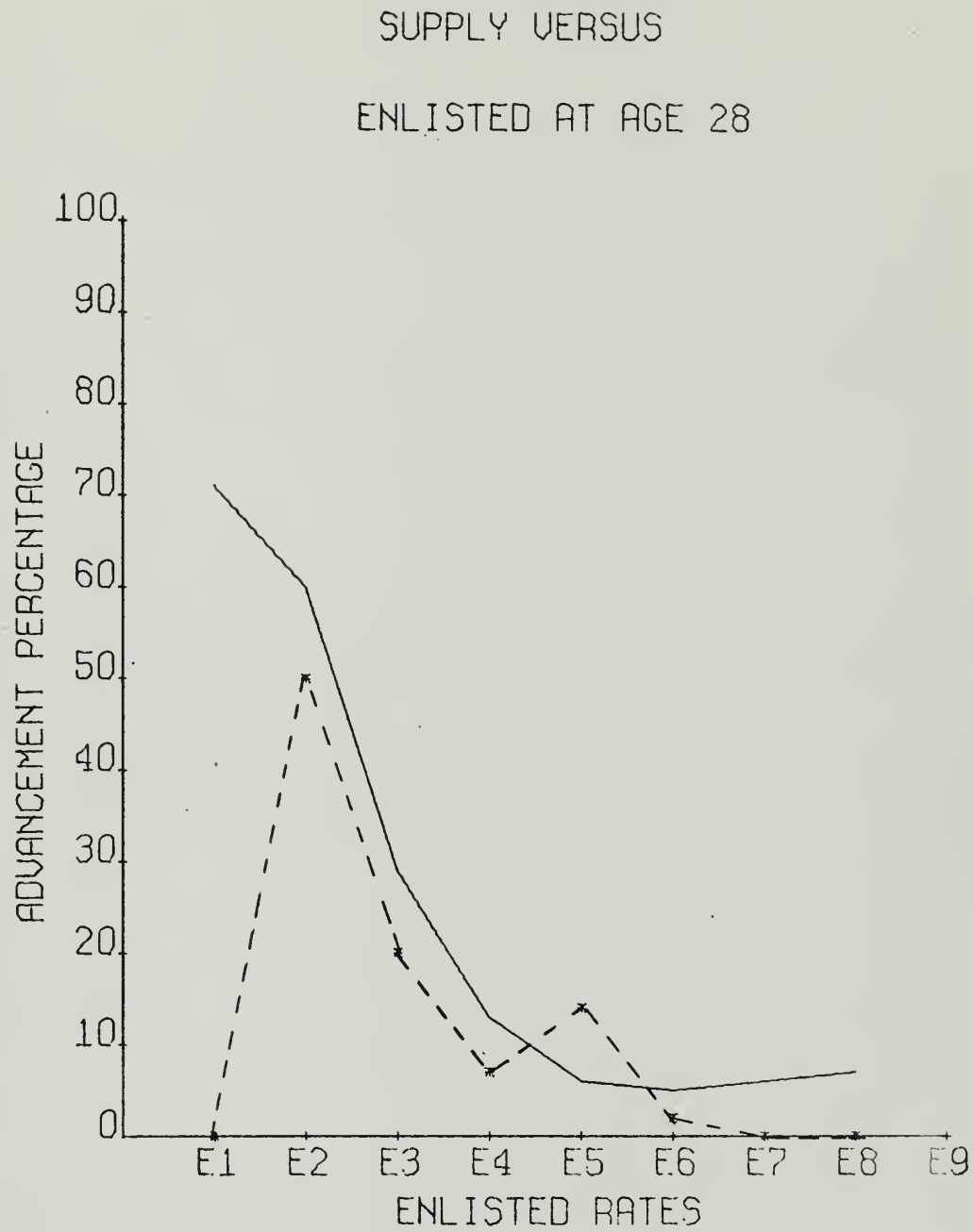
SUPPLY VERSUS
ENLISTED AT AGE 28
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 75

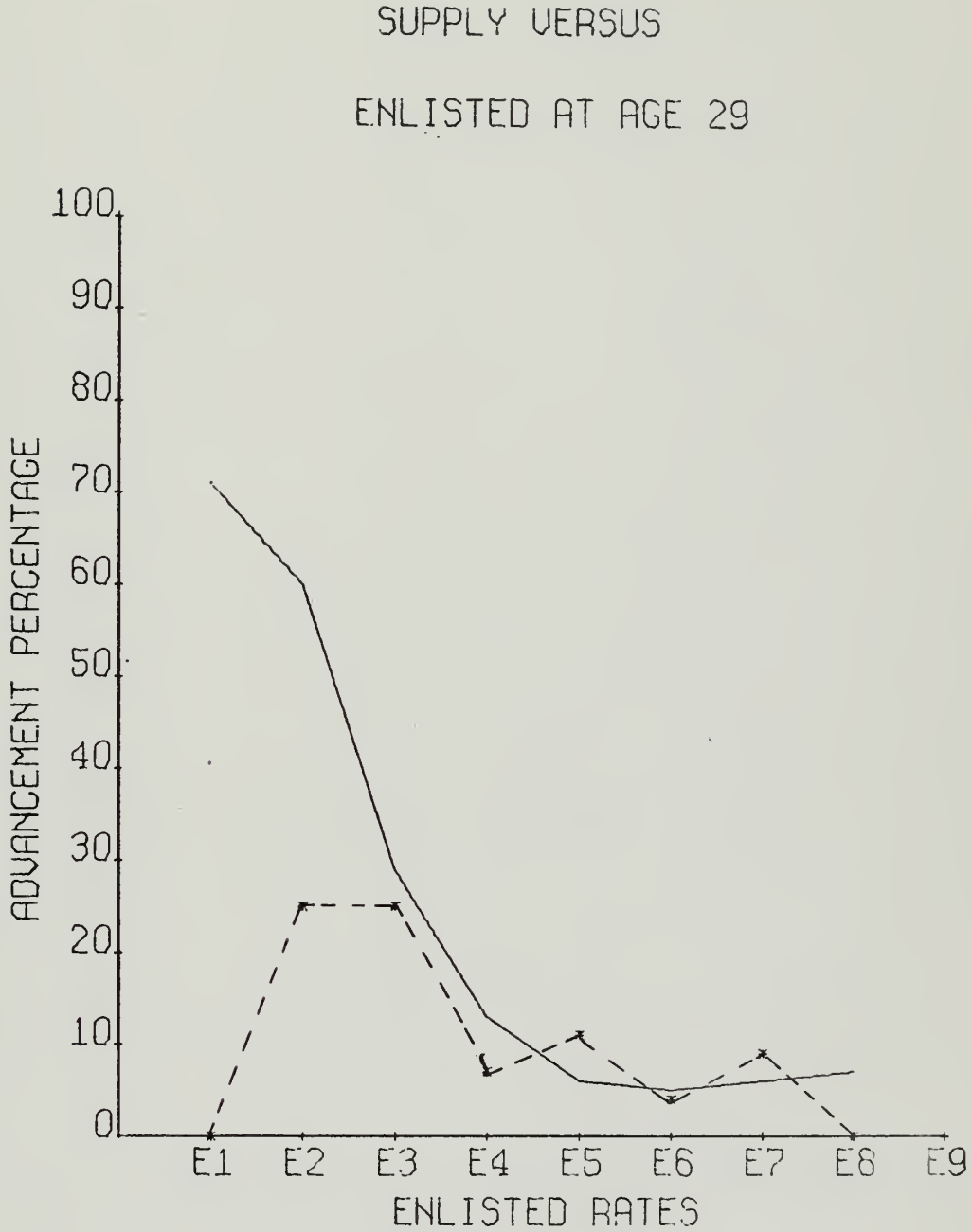
SUPPLY VERSUS
ENLISTED AT AGE 29
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 76

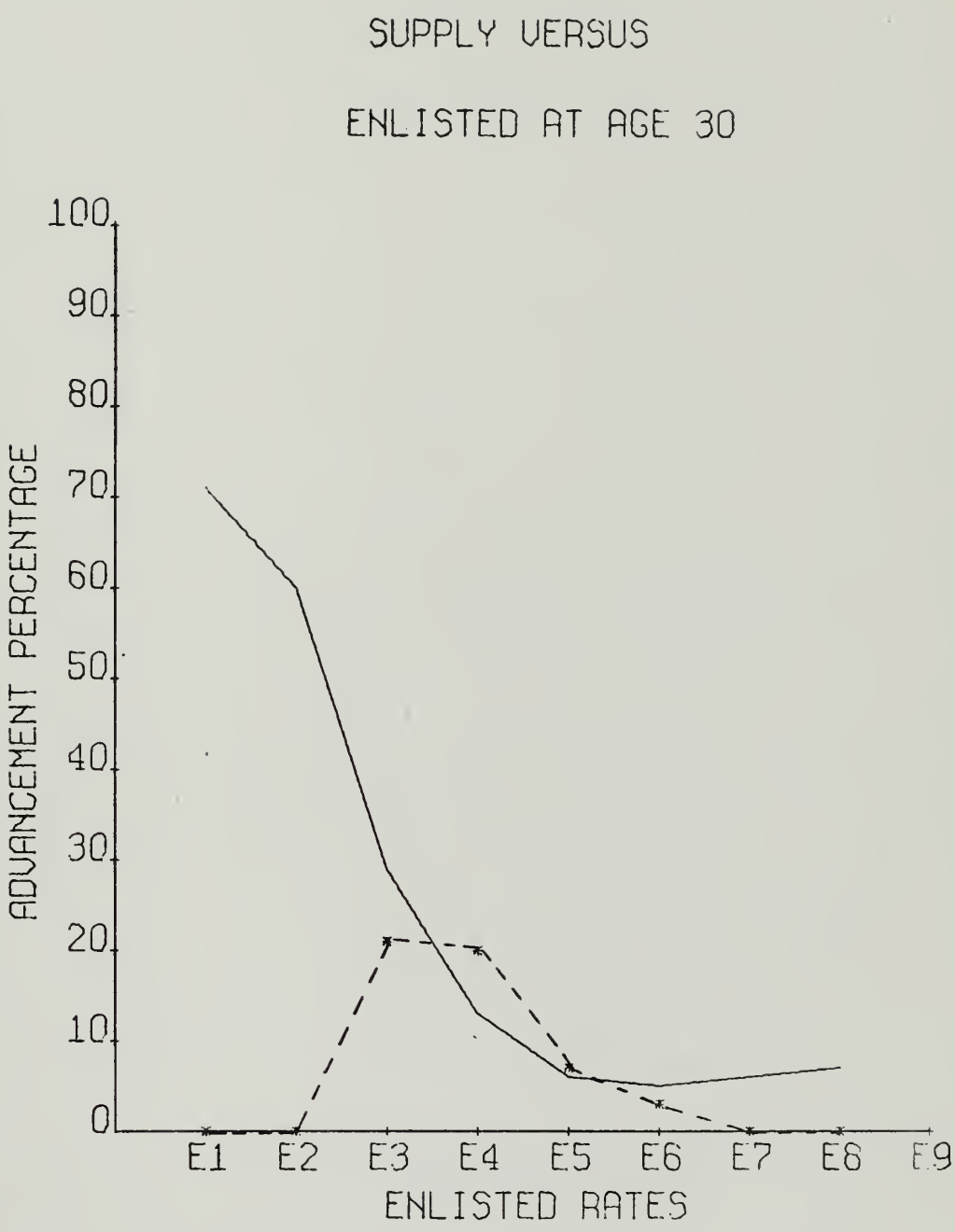
SUPPLY VERSUS
ENLISTED AT AGE 30
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 77

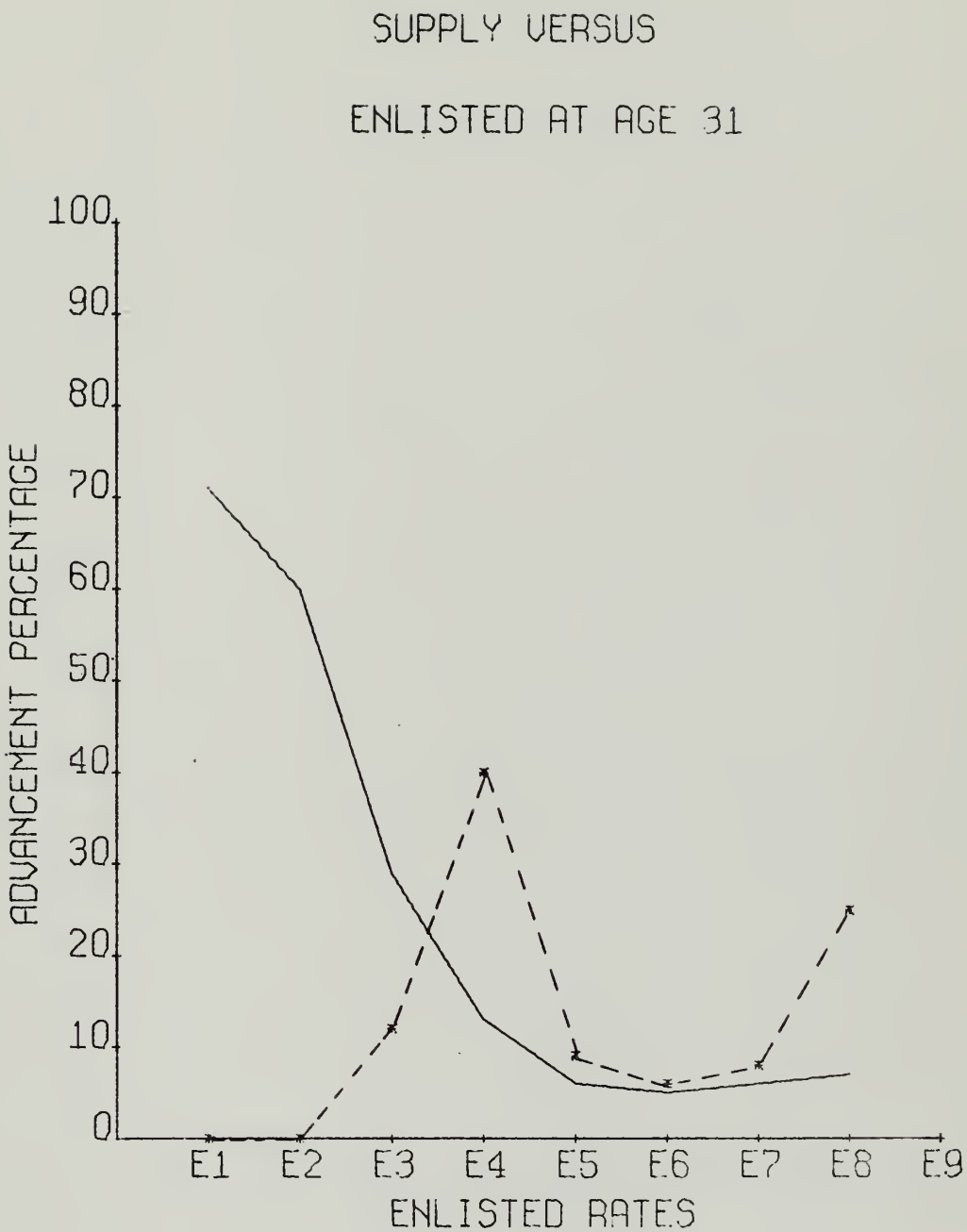
SUPPLY VERSUS
ENLISTED AT AGE 31
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 78

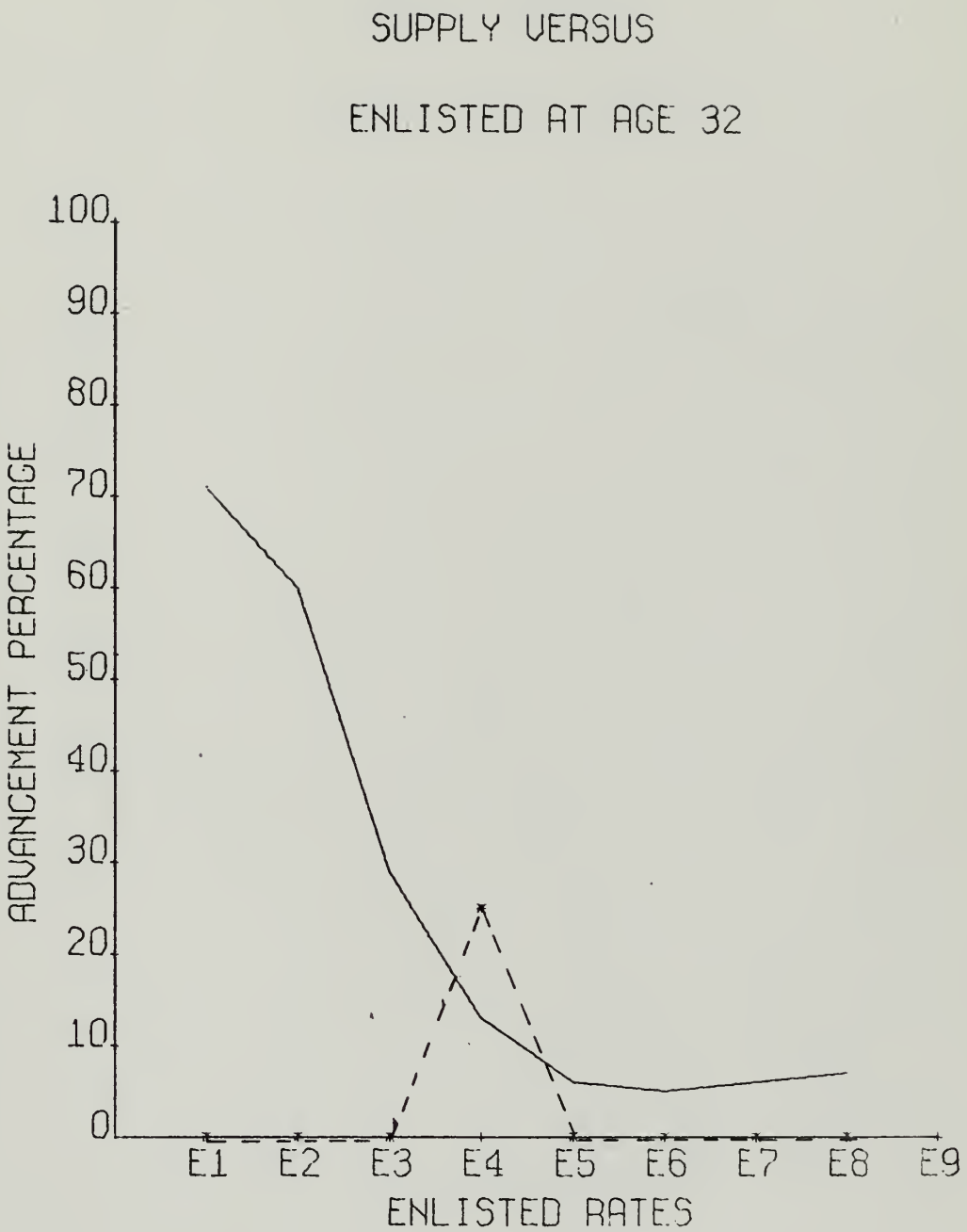
SUPPLY VERSUS
ENLISTED AT AGE 32
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 79

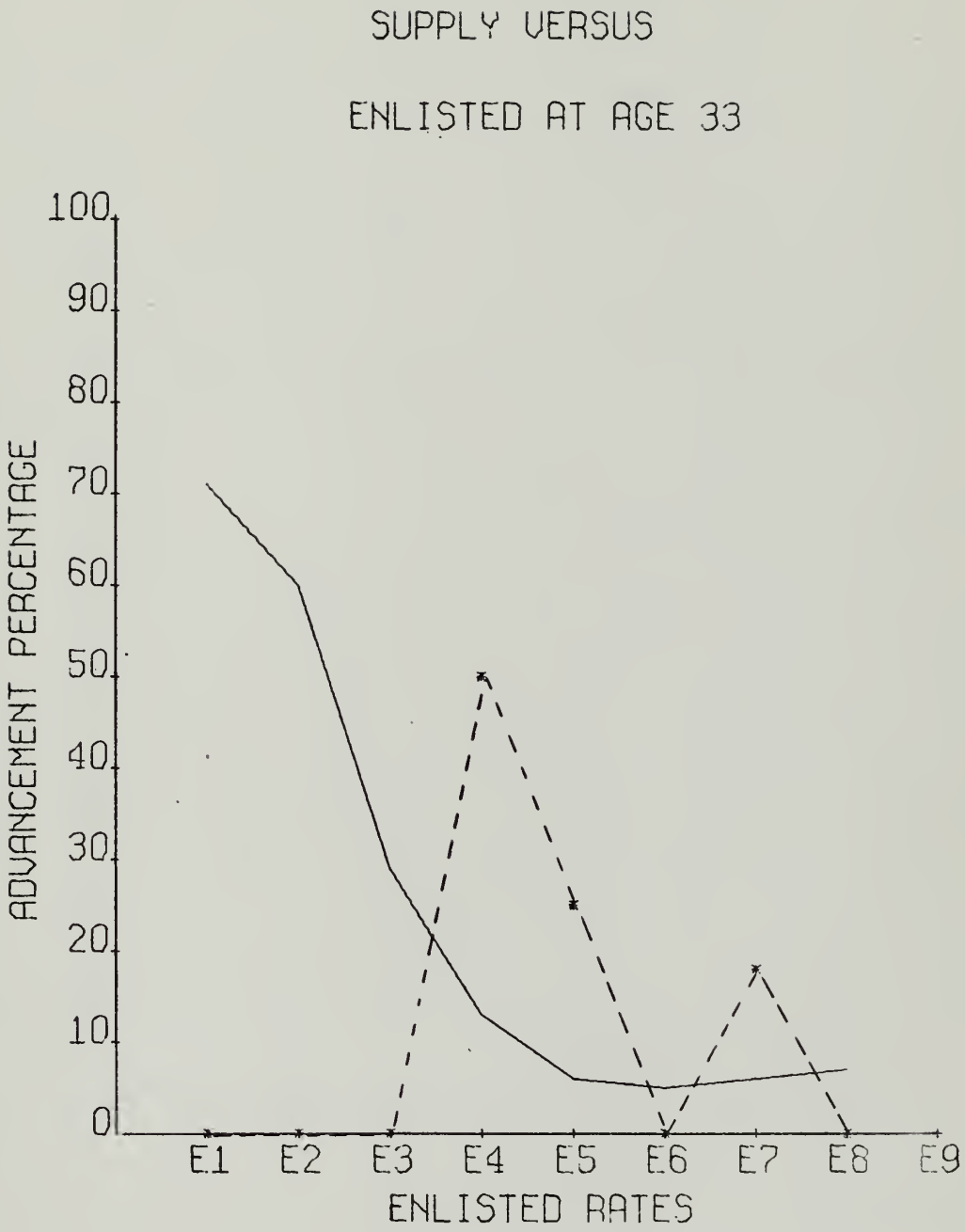
SUPPLY VERSUS
ENLISTED AT AGE 33
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 80

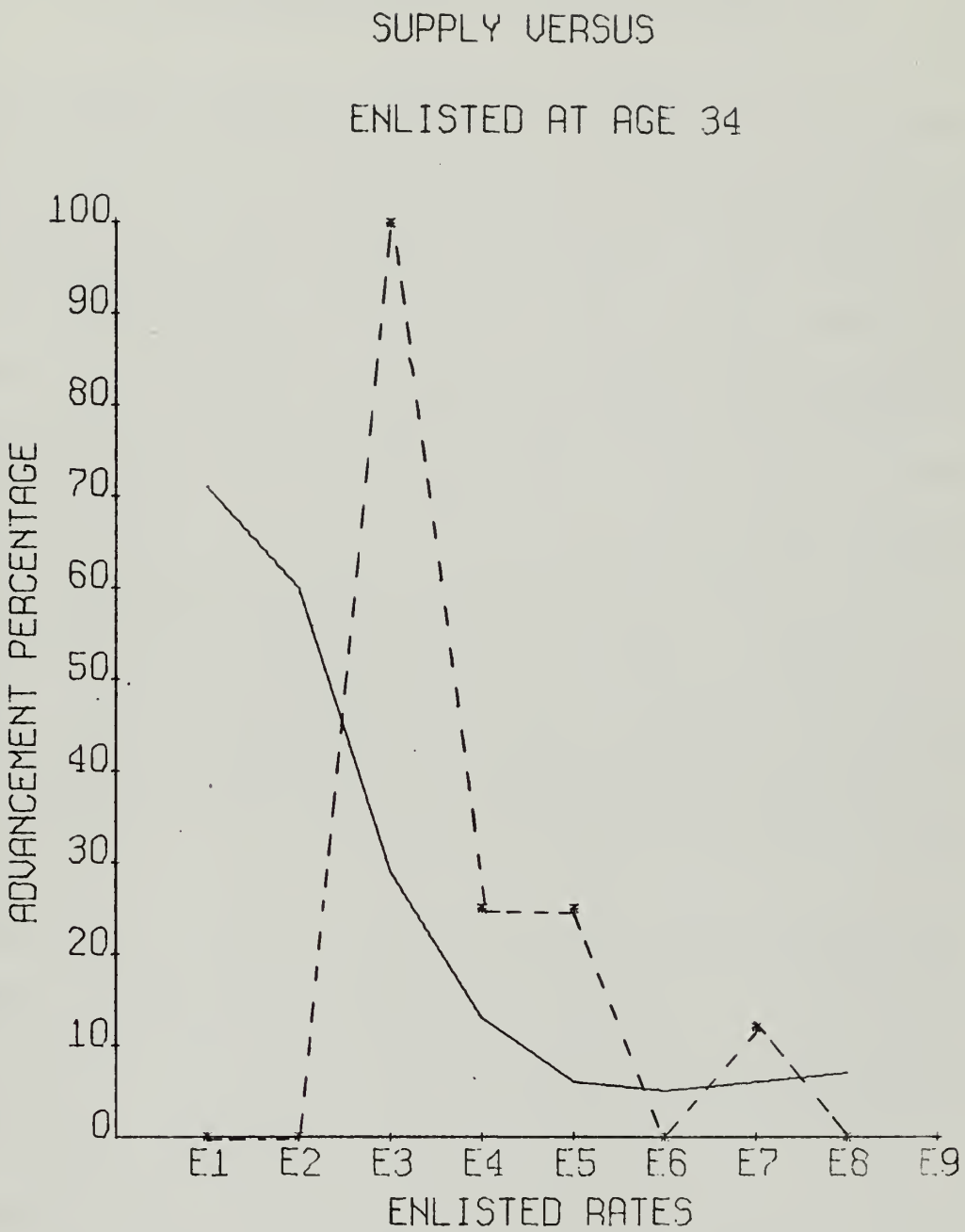
SUPPLY VERSUS
ENLISTED AT AGE 34
ADVANCEMENT PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
E1
E2
E3
E4
E5
E6
E7
E8
E9
ENLISTED RATES

Figure 81

IV. CONCLUSIONS AND FURTHER RESEARCH

The general conclusion of this thesis is that the characteristics reviewed did show that certain characteristics seemed to be factors in percentage of personnel advancing, particularly in rates E1 thru E4.

From data presented, however, it would be doubtful whether one could say with certainty that the matrices formed could be used for valid predications of future advancements for any category considered. Before any definite conclusion could be made, data for additional years should be obtained and reviewed. If nearly the same results were obtained for each year and the matrices approached a steady state condition, one could perhaps use the matrix generated for projections; provided present policies prevail the matrices might furnish useful predictions.

Further, a study of this sort would be useful in checking certain generally excepted ideas concerning factors which do or do not affect advancement. For example: do personnel from a certain race group have a greater or smaller opportunity to advance in a given rating? This relationship was investigated in this study by a comparison of the race groupings for total Navy against race groupings for personnel in the Supply ratings.

In addition, from the transition matrices generated in this study an analysis of demotion percentages, non-advancement percentages, and

discharge percentages similar to that made for advancement percentages could be made. These percentages could also be compared in cross plots to determine if linearity properties exist.

Also, using methods of logistic transforms outlined in Chapters 4 and 5 of Ref. 3, percentages from the transition matrices generated for this study could be used in regression analysis of the characteristics considered.

APPENDIX A

OCCUPATIONAL AREAS

Group Zero - Gun Crews, and Seamanship Specialists

BM	Boatswain's Mate
QM	Quartermaster

Group One - Electronic Equipment Repairmen

ST	Sonar Technician
OT	Ocean Systems Technician
TM	Torpedoman's Mate
FT	Fire Control Technician
MT	Missile Technician
ET	Electronics Technician
DS	Data Systems Technician
CTM	Communications Technician Maintenance Branch
AT	Aviation Electronics Technician
AX	Aviation Antisubmarine Warfare Technician
AQ	Aviation Fire Control Technician
TD	Tradesman

Group Two - Communications and Intelligence Specialists

SM	Signalman
RD	Radarman
RM	Radioman

CTT	Communications Technician Technical Branch
CTR	Communications Technician Collection Branch
CTI	Communications Technician Interpretive Branch
AW	Aviation Antisubmarine Warfare Operator
AC	Air Controlman
PT	Photographic Intelligenceman

Group Three - Medical and Dental Specialists

HM	Hospital Corpsman
DT	Dental Technician

Group Four - Other Technical and Allied Specialists

DM	Illustrator Draftsman
MU	Musician
EA	Engineering Aid
AG	Aerographic's Mate
PH	Photographer's Mate

Group Five - Administrative Specialists and Clerks

CTA	Communication Technician Administrative Branch
CTO	Communication Technician Communications Branch
YN	Yeoman
PN	Personnelman
DP	Data Processing Technician
SK	Storekeeper
DK	Disbursing Clerk

JO	Journalist
PC	Postal Clerk
AK	Aviation Storekeeper
AZ	Aviation Maintenace Administrationmen

Group Six - Electrical/Mechanical Equipment Repairmen

GM	Gunner's Mate
MM	Mineman
IM	Instrumentman
PI	Precision Instrumentman
OM	Opticalman
MM	Machinist's Mate
EN	Engineman
BT	Boiler Technician
BR	Boilermaker
EM	Electrician's Mate
IC	Interior Communication Electrician
CM	Construction Mechanic
AD	Aviation Machinist's Mate
AO	Aviation Ordnanceman
AB	Aviation Boatswain's Mate
AE	Aviation Electrician's Mate
AM	Aviation Structural Mechanic
PR	Aircrew Survival Equipmentman
AS	Aviation Support Equipment Technician

Group Seven - Craftsmen

LI	Lithographer
MR	Machinery Repairman
SF	Shipfitter
DC	Damage Controlman
PM	Patternmaker
ML	Molder
CE	Construction Electrician
EO	Equipment Operator
BU	Builder
CU	Constructionman
SW	Steelworker
UT	Utilitiesman

Group Eight - Services and Supply Handlers

CS	Commissaryman
SH	Ship's Serviceman
SD	Steward

APPENDIX B

ENLISTED MASTER TAPE RECORD

TAPE POS.	ITEM DESCRIPTION
001	Blank
002-008	Service Number
009	Sex
010-040	Name
041	*Gain/Loss/Miscellaneous Indicator
PRESENT RATE - 042-067	
042-046	Abbreviation
047-051	Code
052-053	Key
054	Rate Auth Code
055	*Indicator
056-061	Time in Rate Yr/Mo/Da
062-066	Previous Rate Held
067	Field Advancement Code
PROSPECTIVE RATE - 068-100	
068-072	Abbreviation
073-077	Code
078-083	Terminal Date Yr/Mo/Da
084	Month of Promotion

TAPE POS.	ITEM DESCRIPTION
085-100	Blank
101	Training Program Code
PROFICIENCY PAY - 102-110	
102	Code
103	Proficiency Pay Retention Code
104-105	Proficiency Pay Retention Data Y/M
106	Blank
107	Proficiency Pay Error Indicator
108	Blank
109	Proficiency Pay Retention Indicator
110	Proficiency Pay Award Indicator
EDUCATION APTITUDE - 111-143	
111	Blank
112	United States Armed Forces Institute
113-114	Armed Forces Qualification Test
115	*Test Indicator
116-117	Reading Comprehension Test Score
118-119	Mathematics Test Score
120-121	Physics Test Score
122-123	Electricity Test Score
124-125	Blank
126-127	Blank

TAPE POS.	ITEM DESCRIPTION
128-129	General Classification Test Score
130-131	Arithmetic Test Score
132-133	Mechanical Test Score
134-135	Clerical Aptitude Test Score
136-137	Sonar Pitch Memory Test Score
138-139	Radio Code Aptitude Test Score
140-141	Electronics Technician Section Test Score
142-143	Shop Practice Test Score
SPECIAL QUALIFICATIONS - 144-164	
144	*Special Indicator
145	Enlisted Designator Code
146	Limited Duty Classification Designator Code
147	Blank
148-150	Language Code
151	Language Ability Navy Code
152-154	Language Qualification Data M/Yr
155-160	CID Yr/Mo/Da
161	Code
162	Source
163-164	Language Ability LDP Code
SERVICE DATA - 165-230	
165-166	Branch and Class of Service
167	TAR/STAR/SCORE Indicator

TAPE POS.	ITEM DESCRIPTION
168	Blank
169	Variable Reenlistment Bonus Indicator
170-175	Current Enlistment Date Yr/Mo/Da
176-181	Current Active Duty Date Yr/Mo/Da
182-187	Pay Entry Base Date Yr/Mo/Da
188-193	Active Duty Base Date Yr/Mo/Da
194-195	Blank
196-199	Variable Reenlistment Bonus
200-201	Effective Extension of Enlistment, Months
202-203	Reserve Active Duty Obligation, Months
204-207	Estimated Date of Loss to Enlisted Navy Strength Yr/Mo
208-213	Active Duty Obligation EAOS Yr/Mo/Da
214-215	Active Duty Obligation VEY/SCOL. Months
216-217	Active Duty Obligation, Other, Months
218-220	Other Active Federal Service, Months
221-222	Type of Enlistment
223	Term of Enlistment
224	Military Obligation Designator
225	Number of Enlistments in Current Branch and Class of Service
226	*Expiration of Active Obligated Service Indicator
227	Special Type Involuntary Code Key
228	Involuntary Code Indicator

TAPE POS.	ITEM DESCRIPTION
229-230	Involuntary Months Indicator
231	Prior Officer Indicator
232-237	Date of Birth Yr/Mo/Da
238	Race Code
239	Citizenship
240	Religion
241-242	State of Residence
243-245	Place of Birth
246	Primary Dependency
247	Secondary Dependency
248	RVN Information, Code
249-250	RVN Information, Date M/Y
251	Reenlistment Extension Flag
252-255	Shore Duty Commencement Date Yr/Mo
256-257	Naval District Received From
258	PAMI Distribution Code
259-262	Tour Completion Data Yr/Mo
263-266	Sea Duty Commencement Data Yr/Mo
PRESENT ACTIVITY 267-324	
267	Special Category Code
268	Personnel Accounting Machine Installation Code
269-272	Activity Processing Code
273-282	BuPers Activity Code

TAPE POS.	ITEM DESCRIPTION
283-285	Distributional Commander Code
286	Sea/Shore Code
287	Home Port Code
288-303	Activity Short Title
304-306	Activity Type Code
307-309	Accounting Category Code
310	Dependents on Station
311-312	Transient Code
313-318	Date Received on Board Yr/Mo/Da
319-324	Date Transferred Yr/MoDa
1ST PAST ACTIVITY - 325 - 382	
325	Special Category Code
326	Personnel Accounting Machine Installation Code
327-330	Activity Processing Code
331-340	BuPers Activity Code
341-343	Distributional Commander Code
344	Sea/Shore Code
345	Home Port Code
346-361	Activity Short Title
362-364	Activity Type Code
365-367	Accounting Category Code
368	Blank

TAPE POS.	ITEM DESCRIPTION
369-370	Transient Code
371-376	Date Received on Board Yr/Mo/Da
377-382	Date Transferred Yr/Mo/Da
LOSS AREA - 383-406	
383-391	Loss Change Information
392-394	Action Code
395	Recommended for Reenlistment
396-398	DOD Loss Code
399	Pro Pay Code
400	Pro Pay Indicator
401-406	Recruit Station Data
CAREER HISTORY - 407-436	(up to 5 past activities are shown, the most recent appearing in 1st position)
407-408	Months on Board (First)
409	Home Port/Special Category Code (First)
410-412	Activity Type Code (First)
413-414	Months on Board (Second)
415	Home Port/Special Category Code (Second)
416-418	Activity Type Code (Second)
419-420	Months on Board (Third)
421	Home Port/Special Category Code (Third)
422-424	Activity Type Code (Third)
425-426	Months on Board (Fourth)

TAPE POS.	ITEM DESCRIPTION
427	Home Port/Special Category Code (Fourth)
428-430	Activity Type Code (Fourth)
431-432	Months on Board (Fifth)
433	Home Port/Special Category Code (Fifth)
434-436	Activity Type Code (Fifth)
SCHOOL HISTORY - 437-476 (5 most significant)	
437-440	School Code (First)
441-444	Date of Completion Yr/Mo (First)
445-448	School Code (Second)
449-452	Date of Completion Yr/Mo (Second)
453-456	School Code (Third)
457-460	Date of Completion Yr/Mo (Third)
461-464	School Code (Fourth)
465-468	Date of Completion Yr/Mo (Fourth)
469-472	School Code (Fifth)
473-476	Date of Completion Yr/Mo (Fifth)
INDICATORS - 477-489	
477-478	Blank
479	SEAVEY/SHORVEY Indicator
480	Distribution Master Tape Indicator
481	Initial Career/Schools History Completed Indicator
482	Special Category Code

TAPE POS.	ITEM DESCRIPTION
483	SN Change Indicator
484	Navy Finance Center Indicator
485	Special Program Code Indicator
486-488	Estimated Date of Loss to Navy Indicator
489	Program Availability Code
PROSPECTIVE ASSIGNMENT - 490-498	
490	Personnel Accounting Machine Installation Code
491-493	Distributional Commander Code
494	Special Category Code
495-498	Estimated Date of Arrival Yr/Mo
NAVY ENLISTED CLASSIFICATION - 499-522	
499-502	Primary NEC
503-506	Primary NEC Date Yr/Mo
507-510	Secondary NEC
511-514	Secondary NEC Date Yr/Mo
515-518	Tertiary NEC
519-522	Tertiary NEC Date Yr/Mo
EDUCATION LEVEL - 523-535	
523	Degree/Diploma
524-525	Years Education
526-527	Major Field
528-529	Special Field
530-535	Blank

TAPE POS.	ITEM DESCRIPTION
SOCIAL SECURITY NUMBER - 536-544	
545-549	Blank
550	Record Mark

BIBLIOGRAPHY

1. Manual of Advancement (ADMAN), NAVPERS 15989.

2. Manual of The Active Duty Enlisted Master Magnetic Tape Record. NAVPERS 15949C.

3. United States Naval Postgraduate School Report 0211-03, Plotting Package for NPS IBM 360/67, by Patricia C. Johnson, February, 1969.

4. Cox, D. R., The Analysis of Binary Data, p. 43-75, Methuen & Co. LTD., 1970.

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13. ABSTRACT

An analytical review of two consecutive years' data from the Enlisted Master File was made to see if the traits of race, years of education, and occupational group appeared to have any effect on advancement of Navy enlisted personnel. A matrix of the percentage of personnel having each trait, showing advancement, non-advancement, reduction in rate or discharge was computed, and comparison of advancement percentage was made against data from a similar matrix generated for total Navy personnel.

Further conditional matrices were generated for personnel in the Supply ratings only, and comparisons made between the above traits, as well as the traits of number of enlistments, age at enlistment and individual supply ratings. The latter were compared against total of all supply ratings.

The purpose was to reveal existence of differences which might be a factor in personnel advancement, not to explain causes of these differences.

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